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Draft Environmental Impact Statement for the Closure (Withdrawal of Units) of Norton Air Force Base, California

November 1989

DEPARTMENT OF THE AIR FORCE
Headquarters, Military Airlift Command, Scott Air Force Base, Illinois

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COVER SHEET

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Military Airlift Command (MAC), United States Air Force

TITLE

Draft Environmental Impact Statement (DEIS) for the Closure (Withdrawal of Units) of Norton Air Force Base, California

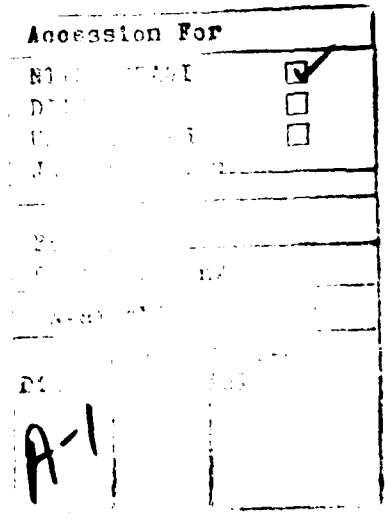
CONTACT

Additional copies or information concerning this DEIS can be obtained from Ms. Patricia Calliott, Headquarters Military Airlift Command, DCS/Engineering and Services, Scott Air Force Base, IL 62225-5001, (618)-256-5764. Comments on the DEIS should be sent to Ms. Calliott, to arrive by January 2, 1990.

ABSTRACT

The action for this EIS consists of withdrawal of various organizational units from Norton AFB and their relocation primarily to March AFB. Other units would be relocated to McChord, Kirtland, Travis, Luke, and McClellan AFBs. The relocation actions will include transfers of personnel, aircraft, and various other equipment and material.

The DEIS assesses the environmental impacts associated with the action. The substantive areas of potential environmental impact that are analyzed are air quality, water resources, earth resources, biotic resources, cultural and historic resources, noise, hazardous waste, accident potential zones, and socioeconomics. The DEIS describes the baseline conditions, potential environmental impacts (beneficial and adverse), and possible mitigations of adverse impacts. The Base Closure and Realignment Act specifically exempts this EIS from considering the need, purpose, or reasons for the withdrawal or alternatives for closure or realignment.



SUMMARY

This environmental impact statement (EIS) analyzes the impacts of withdrawing troops and equipment from Norton Air Force Base (AFB), San Bernardino, California, for relocation to March AFB, California; McChord AFB, Washington; Kirtland AFB, New Mexico; Luke AFB, Arizona; and Travis and McClellan AFBs, California. This EIS does not consider the environmental impacts of receiving these troops, equipment, and operations at these bases listed above. Those impacts are assessed in separate environmental analyses. A second EIS will be prepared to analyze the environmental impacts of the disposal and reuse of Norton AFB.

Public input into the National Environmental Policy Act process was through a public scoping meeting, an agency scoping meeting, notice in the Federal Register, and letters soliciting comments. Issues identified for consideration were transportation (traffic congestion), air quality as it relates to automobile traffic, hazardous waste management, loss of services for retirees, threatened and endangered species, and historical structures. Issues deferred to the second (reuse) EIS include cleanup of hazardous waste, reuse of the base for other activities, air quality related to reuse, groundwater contamination, socioeconomic impacts related to closure and reuse of the base, and sewage treatment on the base. The EIS process was specifically limited by the Base Realignment and Closure Act so that alternatives to the action need not be developed or analyzed.

The primary impacts related to the withdrawal of troops and movement of equipment occur in the area of transportation, primarily between Norton AFB and March AFB (located about 20 miles away). Traffic congestion will increase slightly on area roadways and intersections, contributing to an already congested situation. Much of the transportation impact results from people commuting from the Norton AFB area to March AFB on a daily basis. It is expected that much of this commuting pattern would be for the short term as Air Force personnel living off the base are rotated out of their positions at March and new personnel locate nearer March AFB. Civilian personnel transferred from Norton to March will, on average, experience a longer commute from their residences to March. Due to the volatile housing market in the San Bernardino/Riverside area, and because nearly 80% of civilian commuters to Norton have a 10-mile or less drive to work, it is unlikely that civilian or Air Force Reserve employees will migrate closer to March in the near term. Housing for 264 family units will be retained at Norton for use by Air Force personnel at March. Commuting requirements for these personnel will continue for the long term.

Impacts of withdrawing troops and moving equipment and operations elsewhere had only negligible effects on all other environmental resources. Mitigation for transportation impacts includes organizing carpooling/vanpooling and establishing flexible working hours.

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ACRONYMS AND ABBREVIATIONS

The following list contains most of the acronyms and abbreviations used in this report.

AAFES	Army-Air Force Exchange Service
AAVS	Aerospace Audiovisual Service
ABG	Air Base Group
AFAA	Air Force Audit Agency
AFB	Air Force Base
AFISC	Air Force Inspection and Safety Center
AFOSI	Air Force Office of Special Investigations
AFRES	Air Force Reserves
AGE	aerospace ground equipment
AICUZ	Air Installation Compatible Use Zone
App.	appendix
APZ	accident potential zone
ARAR	applicable or relevant and appropriate requirements
ATC	Air Training Command
Ave.	avenue
AVR	average vehicle ridership
AVS	Audiovisual Squadron
BASH	bird aircraft strike hazard
Bldg.	building
Blvd.	boulevard
BOS	base operating support
BSD	Ballistic Systems Division
Btu	British thermal unit(s)
°C	degree(s) Celsius
CAAQS	California Ambient Air Quality Standards
CAC	California Administrative Code
CARB	California Air Resources Board
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Co.	county
CO	carbon monoxide
Commission	Commission on Base Realignment and Closure
CTS	Commuter Transportation Services
dB	decibel(s)
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
Det.	detachment
Dist.	district

DOC	U.S. Department of Commerce
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DRMO	Defense Reutilization and Marketing Office
EAC	Economic Adjustment Committee
EIS	environmental impact statement
EPCRA	Emergency Planning and Community Right-to-Know Act
EPA	U.S. Environmental Protection Agency
°F	degree(s) Fahrenheit
Fac.	facility
Fig.	figure
FMS	Field Maintenance Squadron
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
FY	fiscal year
FWS	U.S. Fish and Wildlife Service
gal	gallons(s)
HQ	headquarters
IAG	Interagency Agreement
in.	inch(es)
IRP	Installation Restoration Program
IWTP	industrial wastewater treatment plant
Jct.	junction
L	liter(s)
lb	pound(s)
Ldn	day-night average sound level
m	meter(s)
m^3	cubic meter(s)
MAC	Military Airlift Command
MAS	Military Airlift Squadron
MAW	Military Airlift Wing
mi	mile(s)
mi^2	square mile(s)
min	minute(s)
mo	month(s)
MSL	mean sea level
MWh	megawatt-hour(s)

NAAQS	National Ambient Air Quality Standards
NCO	noncommissioned officer
NEPA	National Environmental Policy Act
NLR	noise level reduction
No.	number
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	National Park Service
OEA	Office of Economic Adjustment
OHSPC plan	Oil and Hazardous Substance Pollution Contingency plan
oz	ounce(s)
PAA	primary aircraft authorization
Pb	lead
PCB	polychlorinated biphenyl
PM_{10}	particulate matter with aerodynamic diameters ≤ 10 μm
ppm	part(s) per million
RCRA	Resource Conservation and Recovery Act
Rd.	road
ROD	record of decision
ROG	reactive organic gases
Rte.	route
SAC	Strategic Air Command
SALC	Sacramento Air Logistics Center
SARA	Superfund Amendments and Reauthorization Act
SCAB	South Coast Air Basin
SCAG	Southern California Association of Government
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SO_4	sulfate
SPCC plan	Spill Prevention, Control, and Countermeasures plan
St.	street
SWAT	solid waste assessment test
TCE	trichloroethylene
ton(s)	short ton(s)
TSD	treatment, storage, and disposal
TSP	total suspended particulates
USAF	United States Air Force
USC	United States Code
UST	underground storage tank
V/C	volume to capacity

µg	microgram(s)
µm	micrometer(s)

1 DESCRIPTION OF AND NEED FOR THE ACTION

The action evaluated in this environmental impact statement (EIS) is the closure of Norton Air Force Base (AFB), California. The closure is the result of the recommendations of the Defense Secretary's Commission on Base Realignment and Closure, from legislative requirements in the Base Closure and Realignment Act (Public Law 100-526), and from U.S. Air Force plans to enhance mission readiness and national security. Primarily, the closure of Norton AFB will involve the relocation of its current major assets to March AFB, California; McChord AFB, Washington; and Kirtland AFB, New Mexico. Additionally, Headquarters U.S. Air Force (HQ USAF) recommended relocating selected smaller units from Norton AFB to Luke AFB, Arizona, and to Travis and McClellan AFBs, both in California.

Some construction and modification of several buildings will be required to retain the Aerospace Audiovisual Service (AAVS) and the Ballistic Systems Division (BSD). Isolation of utilities and security controls will also be required.

Provisions of the Act preclude the examination of any alternative actions to closure. Consequently, this document will only examine alternate methods of carrying out the closure. Because the Act requires implementation of the closure/realignment, "no action" is not an alternative and is not specifically included. However, Chapter 3 presents the environmental conditions associated with the installation and its operations. These conditions serve as the baseline against which the implementation impacts are judged.

While the environmental impacts to Norton AFB caused by the departure of units are within the scope of this EIS, the environmental impacts caused by the arrival of units at the new locations are *not* part of this EIS. Those impacts are being assessed in separate NEPA documents focusing on impacts and issues at the various receiving bases.

A second EIS will be prepared to cover the final disposition of the base property (including potential reuse). Reuse involves laws and community issues quite different from the comparatively straightforward steps involved in closure (i.e., halting operations and removing equipment and personnel).

The Defense Secretary's Commission on Base Realignment and Closure ("Commission") was chartered on May 3, 1988, by the Secretary of Defense to recommend military installations within the United States and its commonwealths, territories, and possessions for realignment and closure. Subsequently, the Base Closure and Realignment Act (Public Law 100-526, October 24, 1988) endorsed the Secretary's Commission and required the Secretary of Defense to implement its recommendations unless either he rejected them in their entirety or the Congress passed (and the President signed) a Joint Resolution disapproving the Commission's recommendations.

The primary criterion used by the Commission for identifying candidate bases was the military value of the installation. However, cost savings were also considered, as were the current and projected plans and requirements for each military service. Lastly, the Commission focused its review on military properties and their uses, not military units or organizational/administrative issues.

On December 29, 1988, the Commission recommended the realignment and closure of 145 military installations. Of this number, 86 are to be closed fully, 5 are to be closed in part, and 54 will experience a change (either an increase or decrease) as units and activities are relocated.

On January 8, 1989, the Secretary of Defense approved those recommendations and announced that the Department of Defense would implement them. The Congress did not pass a Joint Resolution disapproving the recommendations within the time allotted by the Act.

Therefore, the Act now requires the Secretary of Defense, as a matter of law, to implement those closures and realignments. Implementation must be initiated by September 30, 1992, and must be completed no later than September 30, 1995. Thus, the decision has been made to close Norton AFB.

The Base Closure and Realignment Act requires the implementing actions to conform to the provisions of the National Environmental Policy Act of 1969 (NEPA), as implemented by the President's Council on Environmental Quality (CEQ) regulations. In addition, this EIS also follows Air Force Regulation (AFR) 19-2, which implements both NEPA and the CEQ regulations within the Air Force system. However, the Act also modified NEPA to the extent that the environmental analysis need not consider:

1. The need for closing or realigning a military installation selected for closure or realignment by the Commission,

2. The need for transferring functions to another military installation that has been selected as the receiving installation, or

3. Alternative military installations to those selected.

1.1 LOCATION OF THE ACTION

Norton AFB is located in southern California in San Bernardino County, about 55 miles east of Los Angeles and 60 miles west of Palm Springs (Fig. 1.1). The area surrounding the base is largely urbanized and contains the cities of San Bernardino, Highland, Redlands, Loma Linda, and Colton (Figs. 1.2 and 1.3). The base comprises 2,003 acres of contiguous property, with the Santa Ana Wash forming the southern boundary (Fig. 1.4). The Air Force also owns two noncontiguous annexes to the base within one mile of its boundary: (1) a small 3-acre parcel southwest of the base used as a navigational marker and (2) a 30-acre parcel northeast of the base, previously used as a transmitter site and now vacant and classified as excess property.

Norton AFB, under the host command of the 63rd Military Airlift Wing (MAW), is one of six Military Airlift Command (MAC) strategic airlift bases that provide airlift for troops and military cargo. To meet peacetime and wartime airlift requirements, MAC maintains three West Coast aerial ports: Travis, Norton, and McChord AFBs. Relocation to March and McChord AFBs maintains three ports and consolidates airlift units to improve command and control at a reduced cost of operations.

Norton AFB is home to numerous tenant units, including those listed in Table 1.1 (page 1-7); App. A provides more detailed descriptions of major tenant organizations and their missions. Many of the tenants support the airlift mission, others provide support to larger tenants (such as the Air Force Inspection and Safety Center [AFISC] and 1352nd Audiovisual Squadron [AVS]), and several are independent of other missions at Norton AFB. The relocation of most of the tenants to March AFB allows the consolidation of many small units requiring office space, thus reducing base operating costs.

The AFISC, the Air Force's functional safety manager, provides Air Force agencies an assessment of their fighting and medical readiness and their resource management effectiveness. Relocating the center from Norton AFB to Kirtland AFB allows consolidation with the AFISC Directorate of Nuclear Surety, already located at Kirtland.

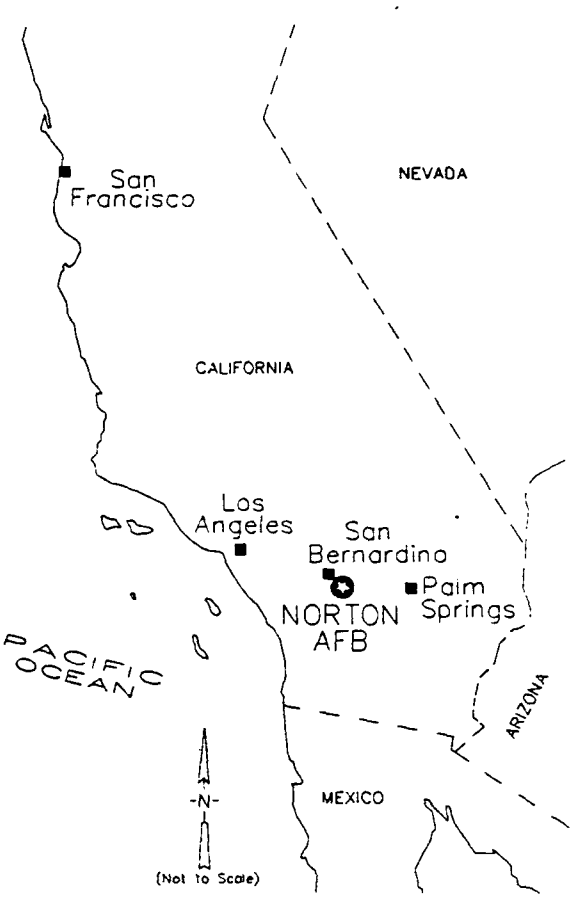


FIGURE 1.1 General Location of Norton Air Force Base

1.2 SCOPING PROCESS AND PREPLANNING ANALYSIS

This EIS evaluating the withdrawal of units caused by the closure of Norton AFB has unique characteristics as dictated by the Base Closure and Realignment Act. As described at the beginning of this chapter, that law makes exemptions to the normal process the Air Force follows to comply with NEPA (42 USC 4321 et seq.) and the CEQ regulations implementing NEPA.

On February 17, 1989, the Air Force published a notice of intent to prepare two EISs for the closure of Norton AFB (Federal Register, Vol. 54, No. 32, pp. 7248-7249). The notice stated that the first of the two would be a closure EIS, focusing on potential impacts associated with ceasing operations. The Air Force committed to a second EIS that would cover the final disposition and reuse of the facilities at Norton. Thus, this first EIS has a limited scope and examines the impacts associated only with implementation of the withdrawal. Impacts at the receiving installations are being assessed in separate environmental assessments.

The February 17 notice of intent also announced a public scoping meeting, which was held in San Bernardino on March 8, 1989. In addition to announcing its intentions in the Federal Register, the Air Force mailed letters to relevant local, state, and federal agencies; the letter indicated that a scoping meeting for agencies would be held in the

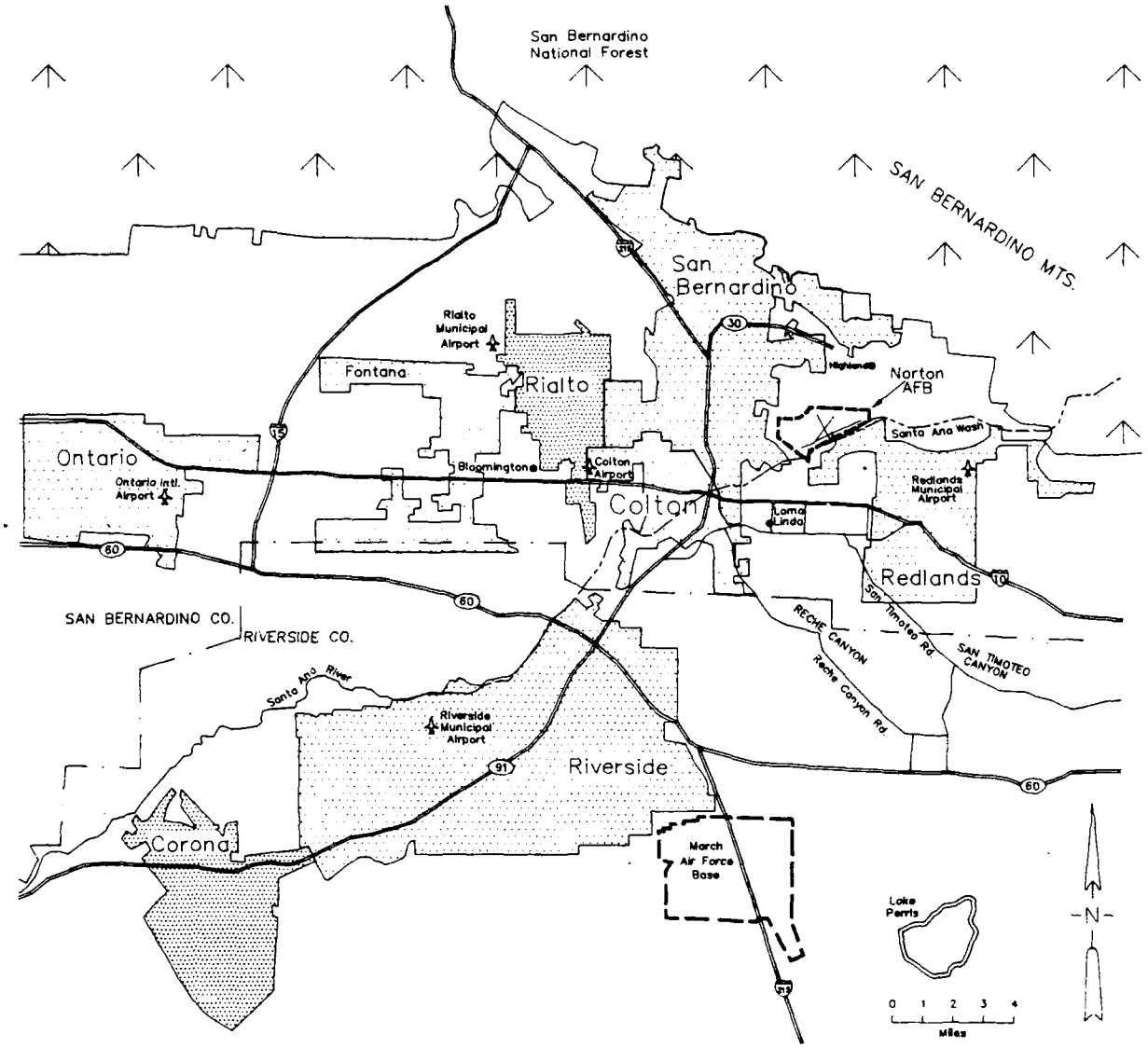


FIGURE 1.2 Immediate Vicinity of Norton Air Force Base (Source: Adapted from Rand McNally 1986)

morning on March 8, 1989. Written comments were also solicited from the public in regard to the base closure. The official comment period was from February 17 until April 7, 1989; however, letters received after that date were also considered in determining the scope of this EIS.

Scoping comments focused primarily on environmental issues related to the second EIS. The primary issue centered on toxic and hazardous waste currently buried on site. The reuse of the base was brought up by several people, as was air quality related to base operation and commuting. The presence of nearby municipal wells caused some concern related to contaminated soil and groundwater. Sewage treatment on base was also indicated as an issue in reference to reuse. All of these topics will be examined in depth in the reuse EIS.

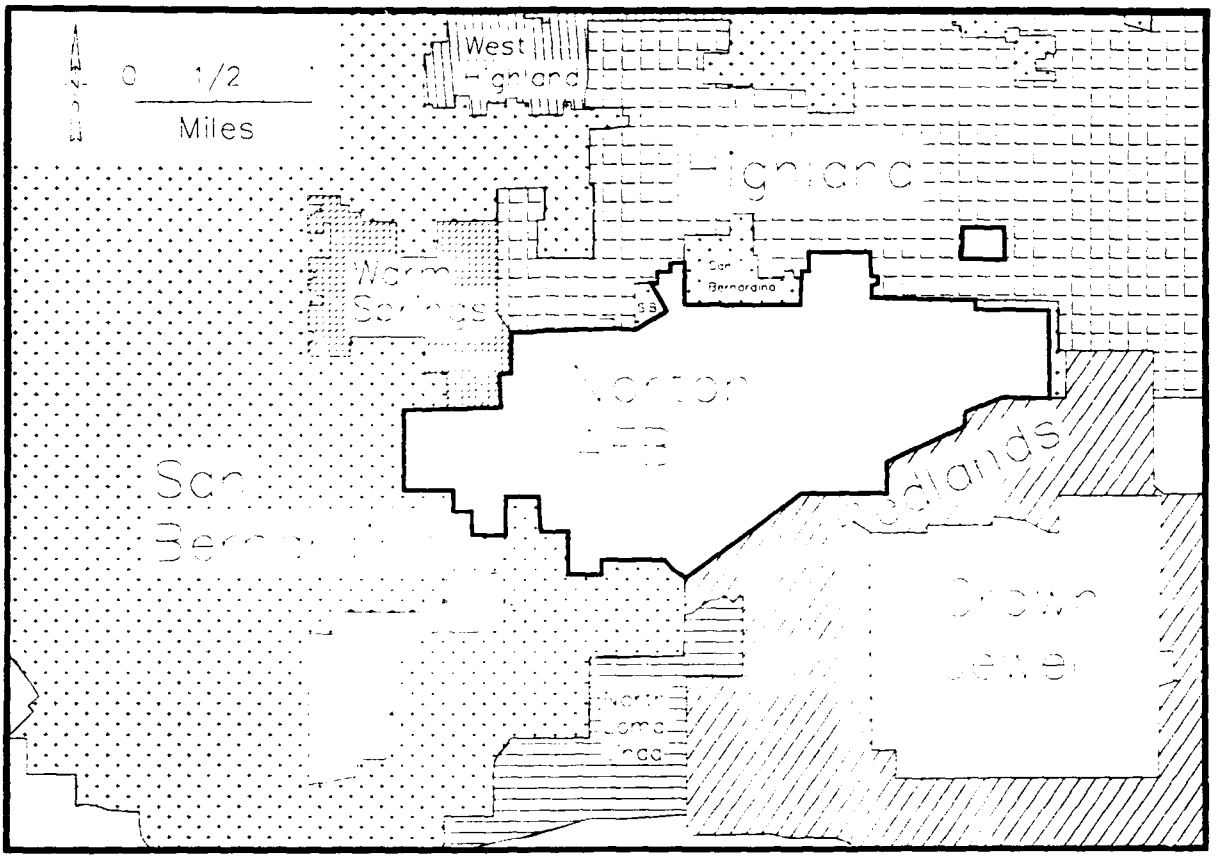


FIGURE 1.3 Communities near Norton Air Force Base (Source: Adapted from Sullivan Publications, Inc. 1988)

Comments related to the closure actions addressed in this first EIS dealt with some aspects of the issues discussed above and included questions or concerns about how the hazardous waste management program would be staffed during the closure activities. The adequacy of waste management plans was also brought up as an issue. The concern was expressed that, with the closure of the base, waste cleanup programs may suffer reduced funding and staffing and thereby fail to achieve compliance. Another issue was the effects on air quality from increased commuter traffic to March AFB. Also related to this was the concern that traffic would increase as people currently employed at the base sought employment in other communities. Thus, impacts on transportation and traffic patterns were identified as important during the scoping process.

Several other issues were identified during the scoping process. The issue of threatened and endangered species was brought up, and one person expressed concern over historical structures being demolished on the base. Effects of the base closure on retirees was also indicated as an issue, with the loss of medical services and the commissary highlighted as a potential problem. These issues are all addressed in this EIS, with the exception of the effects of alternative employment opportunities on traffic congestion. This subject will be considered in the reuse EIS.

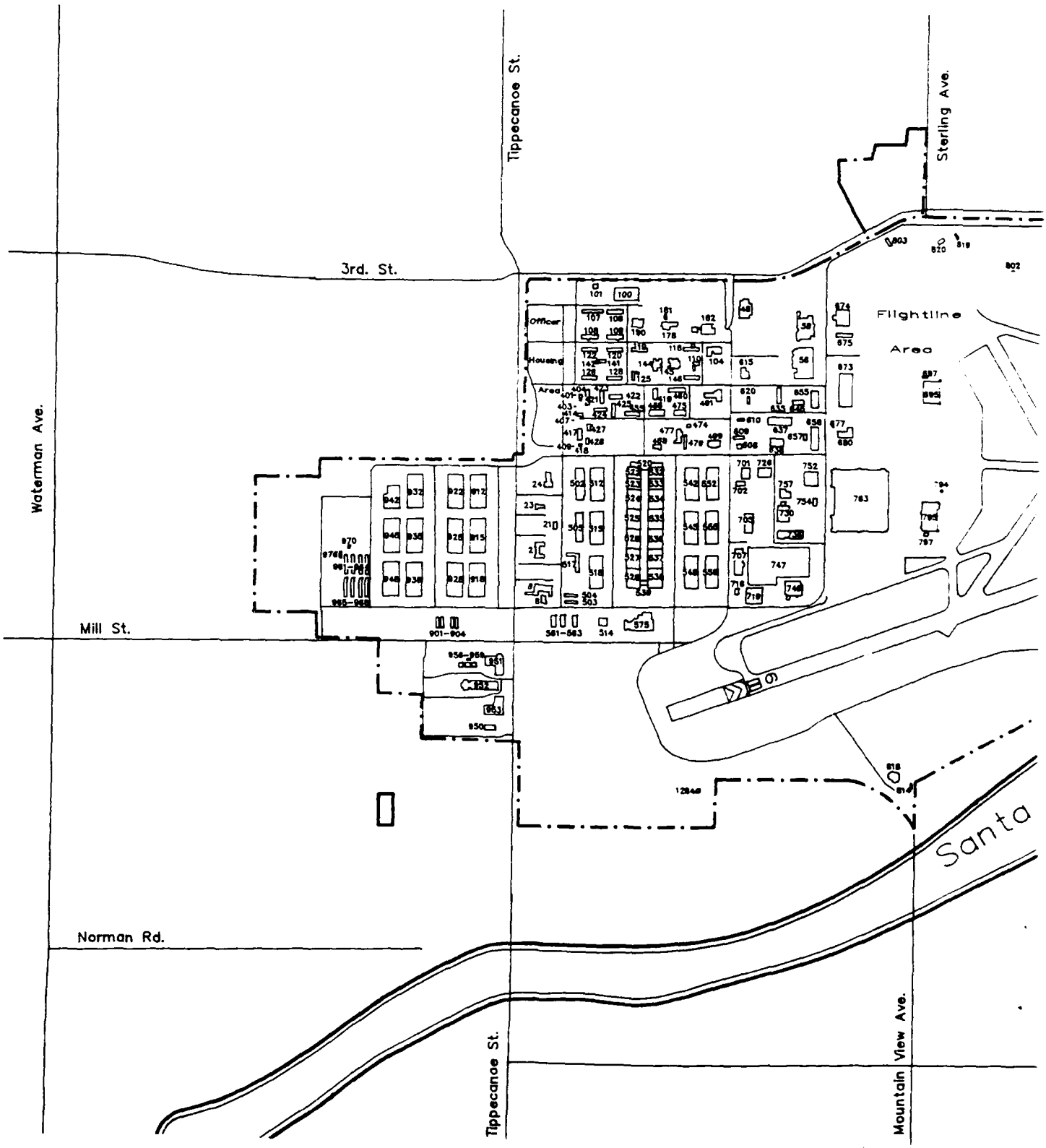


FIGURE 1.4 Site Plan for Norton Air Force Base (Source: Adapted from Norton AFB 1988b)

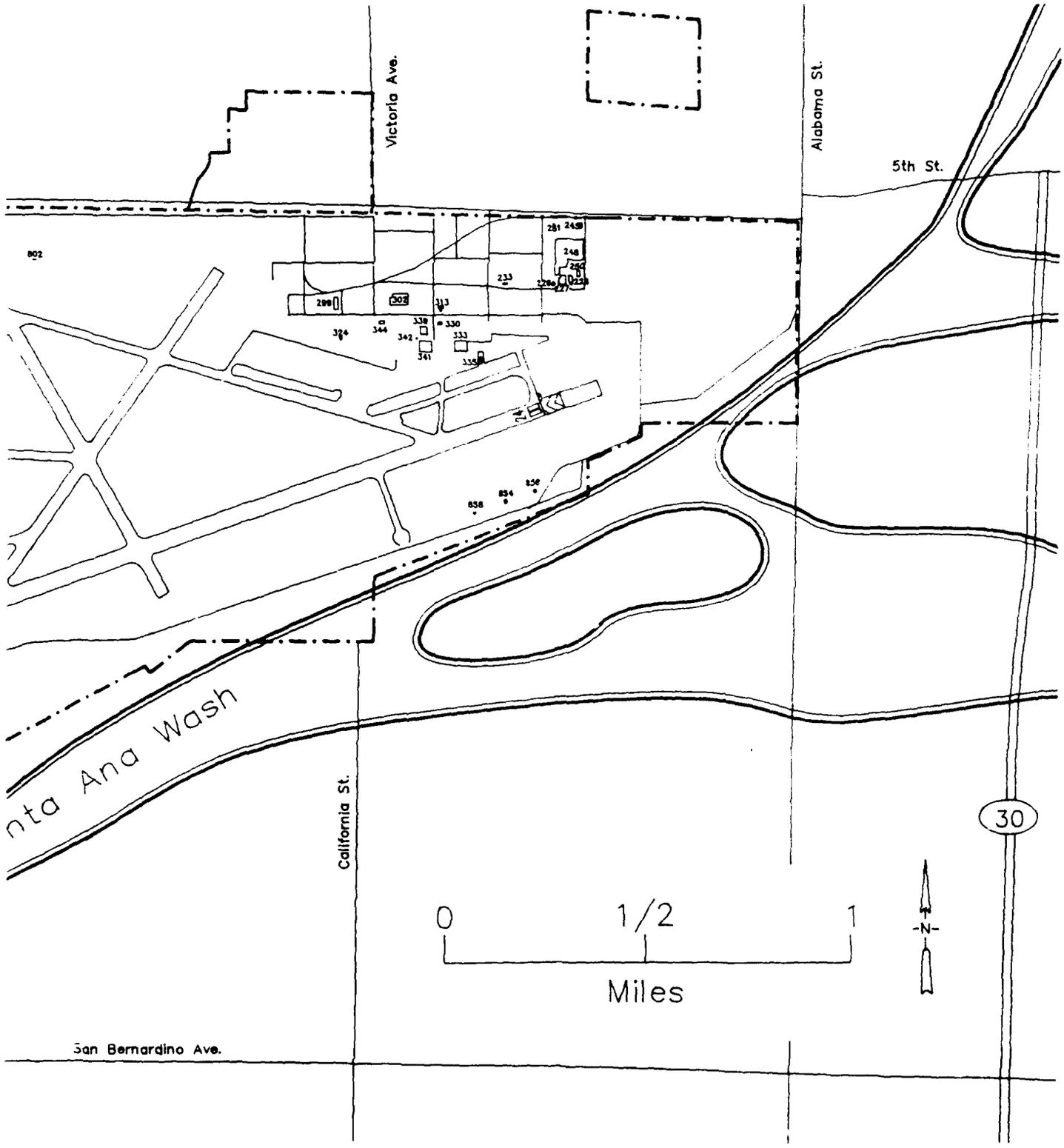

Victoria Ave.
Alabama St.
5th St.
California St.
nta Ana Wash
30
0
1/2
1
Miles
-N-
San Bernardino Ave.

TABLE 1.1 Partial List of DOD Tenant Organizations at Norton Air Force Base

Tenant	Abbreviation[a]	Projected Relocation Date (fiscal quarter)
DOD Tenants		
Air Force Inspection and Safety Center	AFISC	1/94
Air Force Audit Agency	AFAA	1/94
Military Airlift Command Noncommissioned Officer Academy-West	MAC NCO Academy-West	1/94
1400th Military Airlift Squadron	1400th MAS	1/93
445th Military Airlift Wing (AFRES Associate)	445th MAW	1/93
Ballistic Systems Division	BSD	NA[b]
22nd Air Force NCO Leadership School		3/92
Headquarters, Aerospace Audiovisual Service	HQ AAVS	NA
1352nd Audiovisual Squadron	1352nd AVS	NA
1965th Communications Squadron		1/93
3562nd Recruiting Squadron, Air Training Command (ATC)		3/94
Detachment 505, 3754th Field Training Squadron, ATC		3/93
Missile Maintenance and Storage Division		1/93
Detachment 14, 17th Weather Squadron		1/93
Air Force Office of Special Investigations, District 18	AFOSI	3/94
Detachment 10, 1600th Management Engineering Squadron		3/94
Military Air Traffic Coordination Unit		2/92
Detachment 42, Sacramento Air Logistics Center	Det. 42, SALC	4/93
Army-Air Force Exchange Service	AAFES	
Southern Calif. Area Exchange		3/91
Norton Distribution Center		4/94
Defense Reutilization and Marketing Office	DRMO	4/94
Detachment 1840, Defense Investigative Service, AFOSI		3/94
Air Force Regional Civil Engineer, BMS		NA
Army Corps of Engineers		3/94
Civil Air Patrol, Group 18		1/93
Detachment 2, Strategic Air Command Systems Office		3/93
Detachment 6, 2762nd Logistics Squadron, Air Force Logistics Command	AFLC	4/93
		4/93
USAF Clinic Norton		1/93
Defense Contract Administrative Service		4/94
USAF Judiciary Area Defense Counsel		4/94
Air Force Commissary Service, California Regional Office		3/90
Other Tenants		
Norton AFB Credit Union		NA
Wells Fargo Bank		NA
American Red Cross		1/93
U.S. Bureau of Customs		1/93
U.S. Department of Agriculture		1/93

[a]As used in this EIS.

[b]Not applicable.

Source: Norton AFB (1988a).

1.3 RELEVANT STATUTES, REGULATIONS, AND GUIDELINES

This chapter identifies the federal permits, licenses, and other entitlements that may be required in implementing the action.

Various federal environmental statutes impose environmental protection and compliance requirements upon federal agencies, including requirements for these agencies to comply with certain state and local regulatory programs. The Air Force policy is to conduct its operations in an environmentally safe and sound manner in compliance with applicable environmental statutes, regulations, and standards.

The National Environmental Policy Act (NEPA) of 1969 (42 USC 4321 et seq.) establishes broad national environmental policy. NEPA, as amended, requires all federal agencies to prepare an EIS for proposed major federal actions significantly affecting the quality of the human environment. Accordingly, this EIS has been prepared in compliance with the Council on Environmental Quality's regulations on implementing NEPA (40 CFR 1500-1508) and the Air Force Environmental Impact Analysis Process (EIAP), AFR 19-2.

Other federal and state major environmental legislation and regulations that may be applicable to the action are discussed in the following sections.

1.3.1 Water

1.3.1.1 Clean Water Act

The objective of the Clean Water Act (33 USC 1251 et seq., as amended) is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The act requires all branches of the federal government involved in an activity that may result in a point-source discharge or runoff of pollutants to U.S. waters to comply with applicable federal, state, interstate, and local requirements for controlling and abating water pollution to the same extent as any nongovernment entity.

In California, Title 23 of the California Administrative Code (23 CAC) regulates the use of the waters of the state and discharge of effluent into surface waters and groundwaters.

1.3.1.2 Safe Drinking Water Act

The purpose of the Safe Drinking Water Act (42 USC 300 [illegible] seq.) is to set primary drinking water standards for owners and operators of public water systems and to prevent underground injection that can contaminate drinking water sources.

The National Primary Drinking Water regulations in 40 CFR 141 define maximum contamination levels in public water systems. The U.S. Environmental Protection Agency (EPA) has delegated authority to the state of California for regulating public water supplies. In California, 22 CAC regulates drinking water supplies.

1.3.2 Air

1.3.2.1 Clean Air Act

The Clean Air Act (42 USC 7401 et seq., as amended) sets national primary and secondary ambient air quality standards, requires that specific emission increases for major stationary sources and modifications to them be evaluated so as to prevent a significant deterioration in air quality, and provides authority to the EPA to set national standards for performance of new stationary sources of air pollutants and standards for emissions of hazardous air pollutants. As a result, the EPA has established several air permitting programs.

Air quality regulations in the Norton AFB area are established and administered by the South Coast Air Quality Management District.

1.3.2.2 California Clean Air Act

The California Clean Air Act of 1988 (AB 2595, effective Jan. 1, 1989) is modeled after the federal Clean Air Act. The basic requirements of the law include (1) identification of air basins within the state as nonattainment, attainment, or unclassified in meeting the state ambient air quality standards, (2) attainment plans for nonattainment pollutants and their precursors, (3) extensive vehicular emission control strategies, (4) mandatory reductions of nonattainment pollutant emissions from both vehicular and nonvehicular sources, and (5) modification of permitting and variance procedures. In general, the state ambient air quality standards are more stringent than federal standards, and state attainment plans generally require more stringent emission control strategies.

1.3.3 Solid and Hazardous Waste

The management of solid and hazardous waste is regulated by the Resource Conservation and Recovery Act (RCRA), which was enacted in 1976 to amend the Solid Waste Disposal Act and was itself amended in 1984 (Hazardous and Solid Waste Amendments, 42 USC 6901-6987). RCRA provides for the protection of the public health and environment from activities associated with the use, handling, treatment, and disposal of solid and hazardous wastes. It sets forth requirements for generators and transporters of hazardous waste and also establishes a specific permit program for the treatment, storage, and disposal (TSD) of hazardous wastes.

Subpart D of RCRA provides for the development of state plans for solid waste disposal and resource recovery. The objectives of Subpart D are to assist in developing and encouraging methods for solid waste disposal that are environmentally sound, maximize the recovery of valuable resources from solid waste, and encourage resource conservation. Solid waste is defined by RCRA as (1) any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and (2) other discarded material, including solid, liquid semisolid, or contained gaseous

material, resulting from industrial, commercial, mining, and agricultural operations and other community activities.

The EPA has promulgated regulations to implement RCRA Subpart C for the treatment, storage, and disposal of hazardous waste in 40 CFR 260-270. The hazardous waste regulations contain interim status standards applicable to hazardous wastes or constituents from solid waste management units at TSD facilities. For mixed wastes, which contain both hazardous waste and radioactive waste, the hazardous components are subject to RCRA regulations.

Title 23 of the CAC regulates underground storage tanks and specifies requirements for tank closure. State regulations are administered by San Bernardino County. Hazardous wastes within the state are regulated under 22 CAC 4, Chapter 30.

1.3.4 Environmental Response

1.3.4.1 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA (42 USC 9601 et seq., as amended) provides for funding, enforcement authority, cleanup, and emergency-response authority for releases of hazardous substances into the environment. Under CERCLA, releases of hazardous substances into the environment (as defined) must be reported.

Superfund Amendments and Reauthorization Act of 1986 (SARA) reauthorizes CERCLA and establishes a variety of requirements relating to the level of cleanup for remedial actions. SARA also establishes directives for selecting permanent remedies, meeting state requirements, and establishing the role of the state in the cleanup process.

1.3.4.2 Emergency Planning and Community Right to Know Act of 1986 (EPCRA)

EPCRA (42 USC 11001 et seq.) establishes requirements for emergency planning, spill reporting, and inventory reporting for specified classes of hazardous substances at commercial facilities or workplaces with an inventory of toxic or hazardous chemicals. The act requires state and local emergency-planning committees to be established to prepare plans to respond to releases of "extremely hazardous substances" listed by the EPA. Owners and operators of facilities must immediately notify the local and state committees of releases beyond facility boundaries of reportable quantities (initially set at one pound) of substances reportable under CERCLA Section 103(a).

1.3.5 Cultural Resources

Historical and cultural resources are protected under the National Historic Preservation Act (16 USC 470 a-470w-6); Executive Order 11593, Protection and

Enhancement of the Cultural Environment; Archaeological and Historic Preservation Act (16 USC 469-469c); and Historic Sites Act (16 USC 461-467). Pursuant to these acts and the executive order, federal agencies must provide an opportunity as appropriate for comment and consultation with the appropriate State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation when an action has the potential to affect historic or cultural sites.

1.3.6 Endangered Species Act

The Endangered Species Act (16 USC 1531-1543) establishes a federal policy to conserve endangered or threatened species of fish, wildlife, and plants. Federal agencies must determine whether any listed or proposed endangered or threatened species or their habitats would be affected by project activities. If a listed species or critical/proposed-critical habitat may be affected by the project, the agency must consult with the Regional Director of the U.S. Fish and Wildlife Service (FWS) and follow FWS procedures.

2 THE ACTION

The action is implementation of the decision of the Secretary of Defense, upon recommendation by the Commission on Base Realignment and Closure, to close Norton AFB. It consists of the withdrawal of various organizational units from Norton AFB and their relocation primarily to March AFB. Other units at Norton AFB would be relocated to McChord, Kirtland, Travis, Luke, and McClellan AFBs. The relocation actions would include transfers of personnel, aircraft, and various other equipment and material. The potential impacts of relocation at these other bases -- new construction, modifications to facilities, changes in waste-generating activities, etc. -- are not addressed in this EIS but are being assessed in separate NEPA documents. Figure 2.1 provides an overview of the planned schedule for the action. The personnel transfers are listed in Tables 2.1 and 2.2 and summarized in Table 2.3.

Currently, Norton AFB's primary aircraft authorization (PAA), which would be relocated, includes 56 cargo and operational support aircraft: 48 C-141Bs, 4 C-12Fs, and 4 C-21As. Most of Norton's aircraft would be relocated to March AFB (Table 2.4); McChord AFB would receive one active-duty squadron (12 C-141Bs) and its Air Force Reserve (AFRES) associate.

The Air Force intends to retain the Ballistic Systems Division (BSD); Headquarters, Aerospace Audiovisual Service (HQ AAVS); 1352nd Audiovisual Squadron

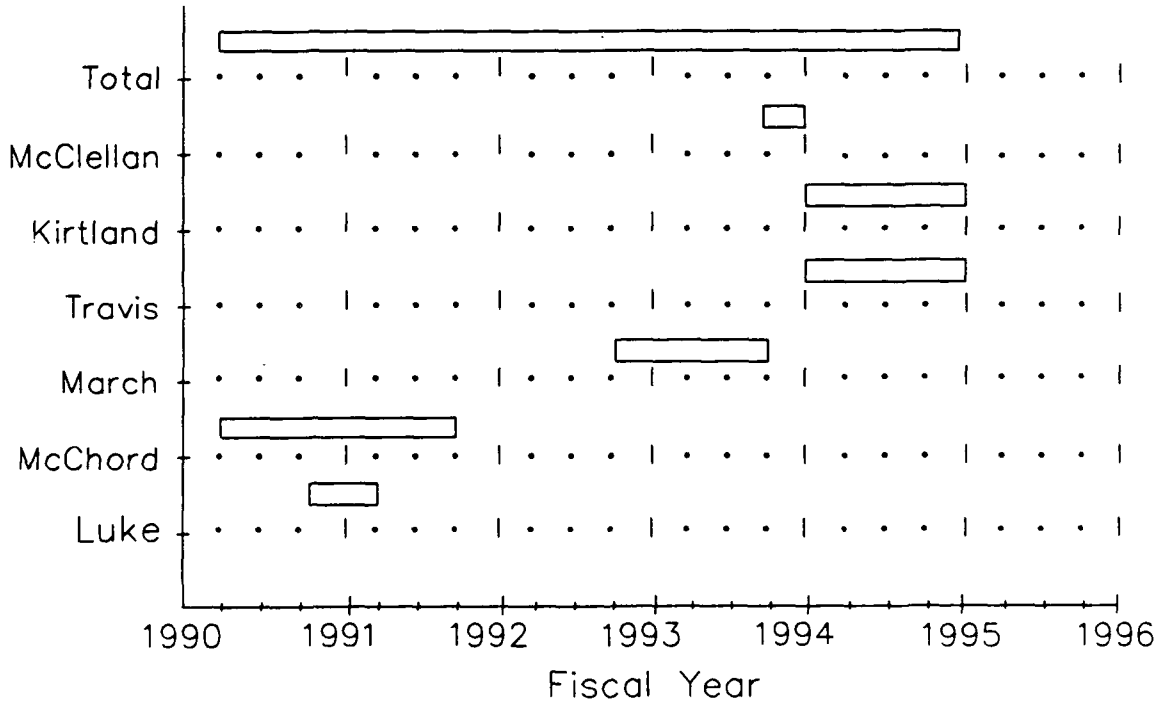


FIGURE 2.1 Schedule Summary for Relocations from Norton AFB (Source: USAF/MAC 1989)

TABLE 2.1 Preliminary Estimate of Full-Time Personnel Affected by the Relocation to March AFB

Unit		Personnel		
		Military	Civilian	Total
63rd MAW	2,041	303	2,344	
445th MAW (AFRES assoc.)		0	259	259
AF Audit Agency		51	142	193
AFOSI, Dist. 18 and Det. 1840		42	13	55
1400th MAS	30	2	32	
Defense Courier Service		9	0	9
3562nd USAF Recruiting Squadron		18	2	20
Other tenants	19	77	96	
Base operating support		348	141	489
All units	2,558	939	3,497	

Source: USAF/MAC (1989).

TABLE 2.2 Preliminary Estimate of Full-Time Personnel Affected by the Relocation to McChord AFB

Unit		Personnel		
		Military	Civilian	Total
Active Duty	512	1	513	
AFRES technicians		0	70	70
Base operating support		65	21	86
All units	577	92	669	

Source: USAF/MAC (1989).

TABLE 2.3 Summary of Estimated Full-Time Personnel Dispositions Resulting from the Action

Disposition	Military	Civilian	Total
Appropriated Fund Personnel			
To March AFB 2,558	939[a]	3,497	
To McChord AFB	577	92	669
To Kirtland AFB	346	138	484
To Luke AFB 0	4	4	
To Travis AFB	21	4	25
To McClellan AFB	55	236	291
Retained at Norton AFB[a]	791	722	1,513
Manpower reductions	705	655	1,360
Current total, Norton AFB	5,053	2,790	7,843
Nonappropriated Fund Personnel[b]			
Morale, Welfare, Recreation (nonappropriated fund employees)			350
Base Exchange employees			300
Warehouse employees			65
Contractor Personnel Working on Norton AFB[c]			
Contractors and subcontractors - Ballistic Systems Division			1,302
Contractors - Aerospace Audiovisual Service			132
Miscellaneous contractors			200

[a]Of this number, 243 are AFRES technicians.

[b]The jobs identified above are expected to be cut. How many of these people will attempt to find and be given jobs at March AFB is unknown.

[c]There is no change expected for the contractors for BSD and AAVS since those organizations will remain at Norton AFB. Of the remaining contractors, some may move to March, some may remain at Norton, and other contracts may be canceled.

Sources: USAF/MAC (1989) for appropriated fund personnel; 63rd MAW/CC-CARE (1989) for nonappropriated fund and contractor personnel.

(AVS); and their associated support units at Norton AFB because of the high cost of relocating them and because their mission requires them to remain in the local area. BSD and associated units employ about 675 military and 585 civilian personnel. The HQ AAVS and 1352nd AVS together employ 116 military and 137 civilian personnel.

The construction program required to retain the BSD includes interior modification of the former AFISC facility (Building 918) and the possible rehabilitation of two warehouses. New exterior doors, fencing, and gates will be required for security control, and utilities will be isolated from the remainder of the installation. Approximately $9.7 million will be required for this construction.

TABLE 2.4 Aircraft to Be Relocated to March AFB

Aircraft	Norton PAA	Approx. Annual Flying Hours
C-141B	3642,400	
C-21A	42,700	
C-12F	42,700	

Source: USAF/MAC (1989).

The construction program to retain the AAVS will require rehabilitation of Buildings 227 and 248 and similar arrangements for security controls and utility isolation. This will require approximately $1 million.

Additionally, in order to reduce the shortage of family housing in the local area, Norton AFB military family housing will be retained as satellite housing for use by personnel assigned to March AFB. Norton AFB housing includes 264 existing family units.

2.1 RELOCATION TO MARCH AFB, CALIFORNIA

The action includes the relocation of the following units from Norton to March AFB:

- The 63rd MAW and 445th MAW (AFRES associate), minus reductions in base operating support (BOS) staff and personnel transferred to McChord AFB (see Section 2.1.2)
- HQ Air Force Audit Agency (AFAA), including detachments
- Air Force Office of Special Investigation (AFOSI), District 18
- 1400th Military Airlift Squadron (MAS)
- Defense Courier Service Office
- 3562nd USAF Recruiting Squadron
- About 11 smaller support and nonassociated tenant units

The relocation includes the personnel listed in Table 2.1 and the aircraft listed in Table 2.4.

The basic mission of the relocated units will remain unchanged. These moves would enhance command and control and reduce cost of operations while still providing for three strategic aerial ports on the West Coast.

Since the Strategic Air Command (SAC) will remain the host command at March AFB, appropriate BOS personnel authorizations will be transferred from MAC to SAC (including medical personnel). Those Norton AFB support units with counterparts at March AFB (i.e., weather, field training, and communications) will be deactivated as appropriate, and available authorizations will be used to increase the March AFB units to the required strength.

Transfer of the C-141 wings (aircraft . ' personnel) to March AFB will begin in the third quarter of fiscal year 1992 (FY92). '. nsfer of other units to March AFB will begin in the first quarter of FY93.

2.2 RELOCATION TO MCCHORD AFB, WASHINGTON

The action includes the relocation of one flying squadron (12 C-141 PAAs) of the 63rd MAW, one squadron of the 445th MAW (AFRES associate), and associated maintenance and other support personnel from Norton AFB to McChord AFB. The active duty personnel would be assigned to the 62nd MAW and the reserve personnel would become part of the 446th MAW (AFRES associate). This move would enhance command and control and reduce cost of operations while still providing for three strategic airlift ports on the West Coast. The 22nd Air Force Noncommissioned Officer (NCO) Leadership School will also relocate to McChord AFB, as well as a portion of the Air Force Commissary Service's California Regional Office. The responsibility for the northern California bases will go to the Commissary Service's Northwest Regional Office at McChord AFB.

Implementation of this action requires the transfer of personnel authorizations. The estimates of affected full-time authorizations are given in Table 2.2. An additional 405 part-time (reserve drill) personnel authorizations would also be transferred, as well as about 7 personnel from the Air Force Commissary Service.

The basic mission of the units relocated to McChord AFB will remain unchanged.

Aircraft and personnel transfer to McChord AFB will begin about the second quarter of FY90 (see Fig. 2.1).

2.3 RELOCATION TO KIRTLAND AFB, NEW MEXICO

The action includes the relocation of the Air Force Inspection and Safety Center from Norton AFB to Kirtland AFB. This will colocate the AFISC Directorate of Nuclear Surety, currently at Kirtland AFB, with the rest of the center and allow for consolidation

of some functions. No aircraft or missile force structure is involved in the action. The basic mission of the affected units and Kirtland AFB would remain unchanged.

Implementation of this action requires the transfer of personnel authorizations, including about 346 full-time military and 138 civilian personnel, and the moving or disposal of office, shop, and stored materials.

Personnel transfers to Kirtland AFB will begin by the first quarter of FY94 (see Fig. 2.1).

2.4 RELOCATION TO TRAVIS AFB, CALIFORNIA

The action includes the relocation of the 1380th School Squadron (MAC NCO Academy-West) from Norton AFB to Travis AFB. No aircraft or missile force structure is involved in the action. The basic mission of the affected unit and Travis AFB would remain unchanged.

Implementation of this action requires the transfer of personnel authorizations, including about 25 full-time military and civilian personnel and 135 temporary duty students per class (seven classes per year).

Personnel transfers to Travis AFB will begin by the first quarter of FY94 (see Fig. 2.1).

2.5 RELOCATION TO MCCLELLAN AFB, CALIFORNIA

The action includes the relocation of Detachment 42 of the Sacramento Air Logistics Center (SALC) from Norton AFB to McClellan AFB. Detachment 6 of the 2762nd Logistics Squadron will also move to McClellan AFB. No aircraft or missile force structure is involved in the action. The basic mission of the affected units and McClellan AFB would remain unchanged.

Implementation of this action requires the transfer of personnel authorizations, including about 291 full-time military and civilian personnel, and the moving or disposal of office, dormitory, shop, and stored materials.

Personnel transfers to McClellan AFB will begin by the fourth quarter of FY93 (see Fig. 2.1).

2.6 RELOCATION TO LUKE AFB, ARIZONA

The Air Force Commissary Service's California Regional Office will split its responsibilities between Luke and McChord AFBs. Responsibilities for seven bases, including March AFB, will go to the Southwest Regional Office at Luke AFB. Implementation of the action requires the transfer of about 4 personnel.

Personnel transfers to Luke AFB will begin by the third quarter of FY90.

3 AFFECTED ENVIRONMENT

This chapter provides a description of the existing environment that is potentially affected by the action. A brief description of the climate and topography of the region (Section 3.1) is followed by a characterization of the existing physical environment in terms of soil and groundwater contamination by previous activities, on-base underground storage tanks, air quality and emission sources in the area, and surface water and groundwater resources (Section 3.2). Section 3.3 describes biological resources in the area and identifies on-base vegetation and wildlife as well as threatened and endangered species that occur or may occur on base. Section 3.4 on the human environment includes descriptions of archaeological, cultural, and historic resources; the current impact of Norton airfield activities on noise levels and land use and building height restrictions; current generation and use of hazardous materials on base; and various socioeconomic factors, including the regional economic profile, public utilities used by the base, transportation conditions, recreational resources provided by the base, use of the base by military retirees, and other land use factors.

3.1 GENERAL DESCRIPTION OF THE INSTALLATION AREA

3.1.1 Climate

The climate of the San Bernardino Valley is characterized by hot summers, moderate winters, light annual rainfall, generally light to moderate winds, and comfortable humidities. The climate is significantly affected by the valley's spatial relationship to the ocean to the west and southwest, the mountains to the north, and desert to the east. The following discussion of meteorology in the study area is based on observations at the Norton AFB weather observation site. The period of record for hourly data is 1976-1985, and that for daily data is 1943-1985, unless noted otherwise.

Prevailing surface winds at the base are from the west-southwest and west (see the wind rose in Fig. 3.1). Winds from the east quadrant occur most often during the winter; this is primarily a drainage effect from nearby snowcapped mountains. For the remaining three seasons, the prevailing winds are from the quadrant centered about the west-southwest direction; these winds are associated with the persistent sea breeze produced by differential heating of land and water masses.

The annual mean surface wind speed at Norton AFB is 2.8 knots, or about 3.2 mi/h. Monthly mean wind speed is lowest during the fall (averaging 2.5 knots) and highest during the spring (averaging 3.1 knots). Surface wind speeds are greatest from the north (Fig. 3.1). The two distinct types of northerly winds are (1) abnormally dry, hot Santa Ana wind with an anticyclonic curvature and (2) cyclonic gradient wind. These winds, which sometimes reach gale velocity, flow over mountains and through mountain passes down into the coastal and intermediate valley. Gusts as high as 69 knots (about 80 mi/h) have been recorded at Norton AFB.

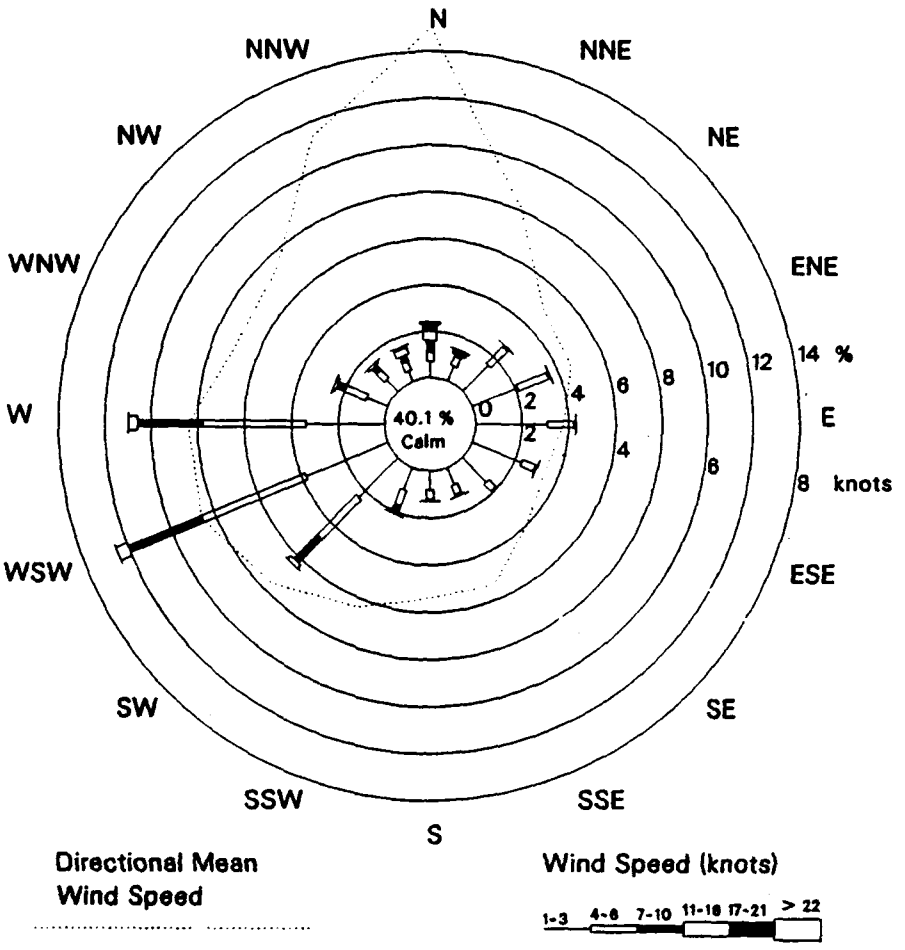


FIGURE 3.1 Annual Wind Rose for Norton AFB, 1976-1985 (Note: 1 knot = 1.15 mi/h) (Source: MAC Air Weather Service 1986)

The annual mean of the maximum daily temperature is 78°F and the mean minimum is 49°F. These mean temperatures, however, do not reflect the wide temperature changes in the San Bernardino area that are influenced by the coastal marine layer, which is replaced at times by continental air masses. July is the hottest month, with an average maximum temperature of 95°F; temperatures above 100°F are very common in June, July, August, and September. January is the coolest month, with an average high of 63°F and low of 38°F. Subfreezing temperatures are occasionally recorded at night in December, January, and February.

Records from Norton AFB show that the annual average rainfall is 13.0 in.; however, 89% (11.5 in.) occurs during the winter months of November through April. January and February are the two wettest months, with average precipitation of 2.52 and 2.25 in., respectively. June and July, with average rainfall of 0.07 and 0.05 in., respectively, are the driest months. The net precipitation (difference between precipitation and evaporation) is negative in the San Bernardino Valley, as is typical for arid climates.

Afternoon (1 p.m.) relative humidities during winter months are generally in the range of 40%. Summer readings are lower, dropping to around 30% in the afternoon. However, relative humidity values occasionally drop to below 10% during periods of dry wind.

3.1.2 Topography and Geography

Norton AFB is located near the southeast corner of the city of San Bernardino and in the northeast corner of the San Bernardino Valley, one of the principal alluvial valleys in the physiographic provinces known as the Transverse and Peninsular ranges. The base is about 55 mi east of Los Angeles, 60 mi west of Palm Springs, and 45 mi northeast of the Pacific Ocean (at its nearest point). Figure 3.2 shows the major geographic features in the study area.

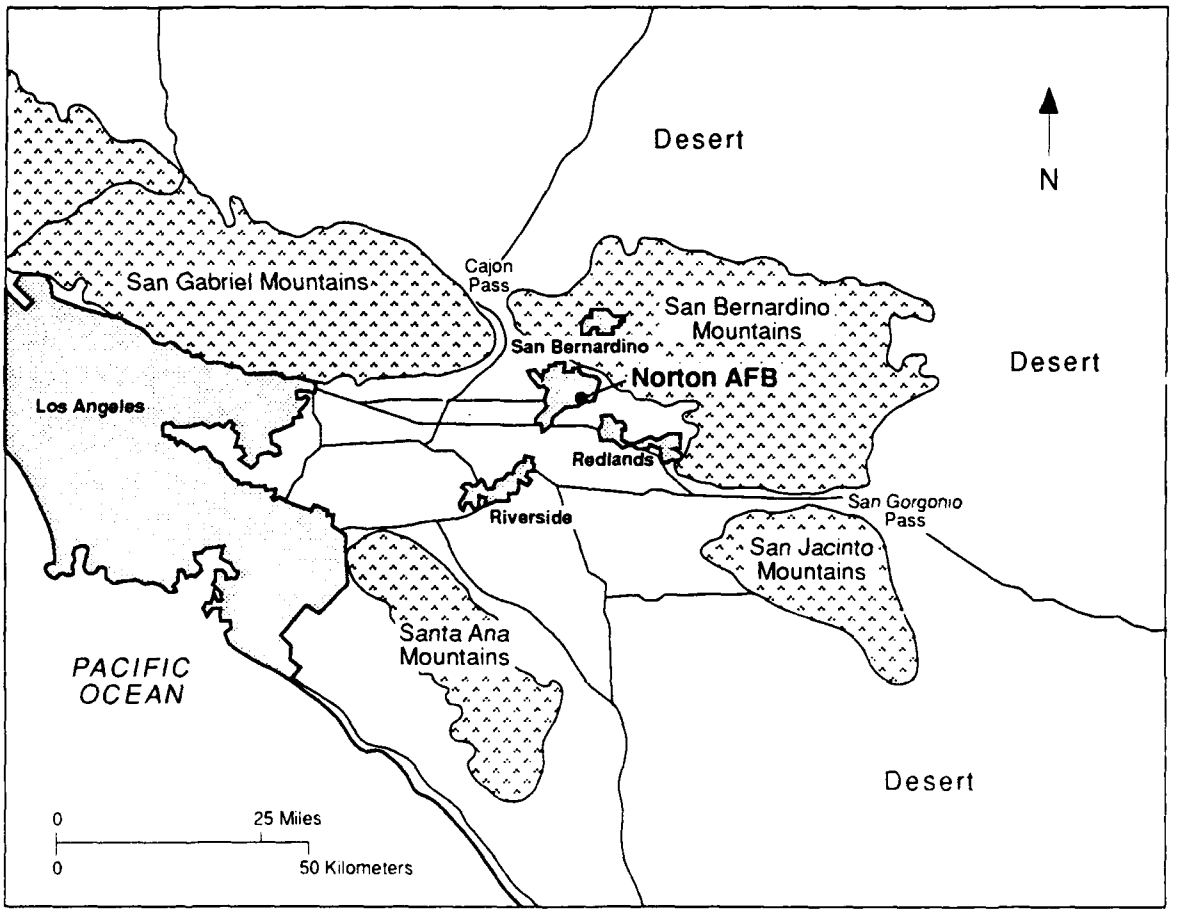


FIGURE 3.2 Major Topographic and Geographic Features near Norton AFB (Source: Based on Defense Mapping Agency 1987)

The San Bernardino Mountains, which trend east-west, are 6 mi north of the base. The San Jacinto Mountains, which trend north-south, begin about 20 mi southeast of the base; a smaller range trending northwest-southeast, the Santa Ana Mountains, begins 25 mi southwest of the base.

The San Bernardino Valley extends westward to the cities of Claremont and Pomona. Two major passes lead out of the valley: (1) the San Gorgonio Pass (sometimes referred to as the Beaumont or Banning Pass), which is 25 mi east-southeast of the base, and (2) the Cajon Pass, which is 15 mi northwest. The Santa Ana River, normally dry in the summer and fall, begins northwest of the base in the San Bernardino Mountains and continues through the citrus groves to the east. From there, it continues just south of the base and meanders southwestward out of the valley.

The overall gradient at Norton AFB slopes downward from east to west with a topographic relief of 0-9%. The eastern boundary of Norton is the highest point, with an elevation of 1,200 ft above mean sea level (MSL). The lowest point, 1,040 ft above MSL, is on the western boundary.

3.1.3 History

Norton AFB was originally established as the San Bernardino Air Depot, an Army Air Force supply facility, in 1941. The base was renamed in 1950 to honor Captain Leland F. Norton, an A-20 bomber pilot and San Bernardino native who was killed in action over France in 1944.

The 63rd MAW traces its lineage back to the 63rd Transport Group, a C-47 airlift unit formed at Wright Field, Ohio, in 1940 to provide wartime movement of Defense personnel and material throughout the United States and Caribbean. In 1942, the Group became a Wing, transferred to Altus AFB, Oklahoma, and was deactivated in 1944. The Wing was reactivated in 1953, equipped with C-124s, and transferred to Donaldson AFB, South Carolina. With the closing of Donaldson AFB in 1963, the Wing moved to Hunter AFB, Georgia. When it closed in 1967, the Wing came to Norton AFB, began flying the C-141A, and started a beneficial association with the Inland Empire of Southern California.

3.2 PHYSICAL ENVIRONMENT

3.2.1 Earth Resources

3.2.1.1 General Description

Norton AFB is located on a vast apron of Pleistocene and Recent alluvium more than 1,000 ft thick, derived from the igneous and metamorphic complex exposed in the San Bernardino Mountains to the north and east. Granitic and gneissic rocks are the most common types in the alluvium at Norton AFB. The Santa Ana River Wash, which

forms the southern boundary of the base, is the largest drainage from the mountains. The channel of City Creek is located along the northern boundary of the base.

The soils at Norton AFB to a depth of 60 in. are classified primarily as belonging to the Tujunga-Soboba Association. Tujunga soils, which comprise the majority of the Norton AFB soils, are somewhat excessively drained and have a surface layer of brown, slightly acidic loamy sand that is gravelly in places. Below this is pale-brown, slightly acidic coarse sand. Soboba soils, which are found in the southeast portions of the base along the Santa Ana Wash, are excessively drained and have a surface layer of grayish-brown, slightly acidic, stony or gravelly loamy sand. Below this is brown, slightly acidic, very stony loamy sand and very pale brown, neutral, very stony sand. The soils of this association are used mainly for irrigated crops, dryland crops, and limited grazing. There are no agricultural activities on the base.

The soils of the Tujunga-Soboba Association are also used as a source of sand, gravel, and road fill. Several sand and gravel mining operations are located along the Santa Ana River bed near the base. Sand and gravel are the only mineral resources in the vicinity of the base.

3.2.1.2 Installation Restoration Program

Several different types of activities in the past at Norton AFB have had the potential to contribute to soil and groundwater contamination at the base. Such activities have included burial of drums and other unspecified materials at several sites in the golf course area; disposal of waste oil, solvent, paint residue, and similar substances into unlined pits, ponds, or drying beds; discharge of waste aviation fuel, oil, lubricant, and miscellaneous combustible materials during fire training exercises; storage of drums with possible leaks on unprotected surfaces; leakage from underground storage tanks containing waste oil, lubricant, and solvent; spills of aviation fuel, oil, solvent, polychlorinated biphenyls (PCBs), acidic plating solution, and similar substances onto unprotected surfaces; and burial of small quantities of low-level radioactive wastes.

These past activities resulted in Norton AFB being placed on the National Priority List (NPL) by the EPA (Federal Register, Vol. 52, p. 27642, July 22, 1987). The NPL is an EPA-generated list of the sites nationwide that pose the greatest hazard to public health and thus warrant priority responses.

Under the mandate of the CERCLA and SARA federal statutes, the Air Force is actively pursuing a program to address and, as necessary, remediate environmental concerns created by these past practices. These federal statutes define the applicability of cleanup requirements to federal facilities (CERCLA Section 120) and establish the Defense Environmental Restoration Program (DERP) with one of its specific objectives being:

> The identification, investigation, research and development, and cleanup of contamination from hazardous substances, pollutants, and contaminants (SARA Section 211).

The DOD-wide program to meet this mandated objective is called the Installation Restoration Program (IRP), which is a subcomponent of DERP. IRP and other DERP actions are funded under a special transfer account, the Defense Environmental Restoration Account (DERA), which also is codified in SARA Section 211. For NPL sites such as Norton AFB, the response actions taken under the IRP are to be consistent, to the maximum possible extent, with all EPA guidelines, rules, etc., which have been promulgated for the EPA CERCLA program.

Three response actions may be used individually or in combination to address an IRP site. They are (1) remedial action process, (2) removal, and (3) monitoring. The remedial action process is to be conducted in the four stages discussed below.

Preliminary Assessment/Site Inspection (PA/SI) Stage. During this stage, sites are identified and reviewed for (1) whether they merit further consideration in the IRP and (2) whether they merit placement on the NPL by EPA. A decision is made at the end of the PA/SI stage on which subsequent step to take (remedial investigation/feasibility study, removal, monitoring, or site closeout).

Remedial Investigation/Feasibility Study (RI/FS) Stage. The objectives of the remedial investigation portion of the RI/FS are to (1) determine the threat to public health and the environment posed by the site, (2) characterize the site, (3) perform a baseline risk assessment, (4) determine applicable or relevant and appropriate requirements (ARARs) for the site, and (5) perform waste treatability tests for the site. The objective of the feasibility study is to select a remedial action that will best mitigate the site's hazards to public health, welfare, or the environment. The RI and FS are interdependent and should be conducted concurrently.

Operable units, sometimes called interim remedial actions, are separable parts of a remedial action that are effective in reducing public health threats. These may be implemented during the RI/FS stage if they are believed to be cost-effective and consistent with the remedial action that will eventually be taken. They may also be implemented during the remedial stage as part of a stepped implementation of a remedial action.

Remedial Design/Remedial Action (RD/RA) Stage. Based on the findings of the RI/FS and in accordance with criteria set forth in SARA and NCP, a remedial action alternative is selected. The formal document presenting that selection is a Record of Decision (ROD) for NPL sites. For NPL sites, the Air Force selects a remedial action alternative, subject to the approval of the EPA Administrator, and documents its selection in an Interagency Agreement (IAG).

Removals as a response action provide a means of responding to an immediate threat or of implementing relatively simple response actions that need not be preceded by detailed planning efforts, as for the remedial action process. They may either supplement or, in certain cases, take the place of a remedial action response.

Removals may involve a wide variety of actions, including those that:

- Remove a hazardous substance from the environment or
- Isolate a community from potential impact by that substance (using, for example, alternative drinking water supplies).

Monitoring as a third possible response action may be implemented when it is not clear whether the site poses a threat. The monitoring, which can be either long or short term, addresses the concentrations and spread of contamination from a site.

Site Closeout Stage. This step is taken following removal actions, monitoring responses, or certain remedial action steps if the threat to public health and environment is within prescribed or negotiated standards, or if and when at any time in the process no further action at the site is deemed required.

Status of the IRP for Norton AFB. At Norton AFB, 22 sites have been identified and evaluated in a process equivalent to the PA/SI stage. At the time these studies were completed, the DOD IRP program was implemented as a four-phase program with the following designations:

- Phase I Records Search
- Phase II Confirmation and Quantification
- Phase III Technology Base Development
- Phase IV Corrective Action

Investigations at Norton AFB were completed through what was designated as Stage 3 of Phase II. These sites and the work performed at each during the most recent and comprehensive field study (Phase II, Stage 3) are given in Table 3.1; the sites are shown in Fig. 3.3.

For Norton AFB, the procedures for completing the remaining IRP stages have been specified in a formal IAG between the EPA, Air Force, and California Department of Health Services (IAG 1989). This agreement also provides schedules for setting of deadlines for completion of the IRP.

The environmental impact of unit withdrawal from Norton, which is being assessed in this EIS, does not directly relate to activities under Stages 2-4 of the IRP. These stages of the IRP would relate more directly to any actions necessary for disposal and reuse of Norton AFB, which will be the subject of the reuse EIS.

TABLE 3.1 IRP Sites at Norton AFB[a]

Site No.	Site Name	Fieldwork Performed during Phase II
1	Industrial waste lagoons	- Soil gas survey - 5 boreholes drilled - 1 borehole completed as monitoring well - 5 monitoring wells installed - 34 soil samples collected - 49 water samples collected
2	Landfill No. 2	- 16 wells installed (northeast base groundwater operable unit) - 12 soil samples collected - 44 water samples collected
3	Waste pit No. 2	- Soil gas survey - Geophysical survey - 4 water samples collected
4	Waste pit No. 1	- See site 1 description
5	Fire protection training area No. 2	- Soil gas survey - 6 boreholes drilled - 43 soil samples collected
6	Underground waste oil storage tank	- Soil gas survey - Geophysical survey - 6 boreholes drilled - 31 monitoring wells installed - 21 soil samples collected - 113 water samples collected
7	IWTP sludge drying beds	- 8 boreholes drilled - 34 soil samples collected - 6 monitoring wells installed - 8 observation wells installed - 55 water samples collected
8	PCB spill area (gate 10)	- No fieldwork performed; site closed out by agreement among EPA, California, and the Air Force due to a lack of contamination
9	Electroplating shop spill area	- 9 water samples collected - 8 boreholes drilled - 15 soil samples collected - 6 monitoring wells installed

TABLE 3.1 (Cont'd)

Site No.	Site Name	Fieldwork Performed during Phase II
10	Landfill No. 1	- Soil gas survey - Geophysical survey - 8 soil samples collected - 3 monitoring wells installed - 4 SWAT soil samples collected - 8 water samples collected
11	Field sludge drying area	- See site 2 description
12	Waste pit No. 3	- See site 10 description
13	IWTP sludge disposal area	- 3 boreholes drilled - 1 boring completed as a monitoring well - 21 soil samples collected - See site 7 description for water samples
14	Waste pit No. 4	- Soil gas survey - 2 boreholes drilled - 9 soil samples collected - See site 6 description for water samples
15	S-290 tank	- 5 boreholes drilled - 17 soil samples collected - Soil gas survey
16	AAVS evaporation basins	- Monitoring well installation and sampling described for site 2
17	Drummed waste storage area/waste fuel and solvent sumps	- 4 boreholes drilled - 18 soil samples collected
18	AVGAS spill area	- Soil gas survey - 3 boreholes drilled - 9 soil samples collected - 3 monitoring wells installed - 10 water samples collected
19	Waste drum storage area No. 2	- 3 monitoring wells installed - 9 water samples collected

TABLE 3.1 (Cont'd)

Site No.	Site Name	Fieldwork Performed during Phase II
20	Low-level radioactive waste burial site	- Geophysical survey
21	Underground ferricyanide tank	- Monitoring well installation and sampling conducted as part of northeast-base groundwater operable unit; see site 2 description
22	IWTP discharge ditch outfall area	- 2 borings drilled - 11 soil samples collected - 2 monitoring wells completed from the borings - Well sampling conducted as part of IWTP groundwater operable unit; see site 2 description

[a]Locations are shown in Fig. 3.3.

Source: Ecology and Environment (1988).

Although the IRP is not directly related to the withdrawal action in this document, it was considered essential to investigate any indirect effects that could occur. As a basis for that investigation, a description of the IRP sites at Norton AFB is provided below; it was adapted from the most recent IRP report for Norton AFB (Ecology and Environment 1988).

The Norton AFB IRP investigation included fieldwork and sample collection, data compilation and evaluation, and endangerment assessments. The fieldwork included geophysical surveys (including borehole logging), drilling of boreholes and installation of monitoring wells, collection of soil and groundwater samples, and aquifer pumping tests. The data gathered provided the basis for the risk assessment. The risk assessments were based on the potential for direct contact with contaminated soils or the use of contaminated water for drinking. The results of the studies to date do not provide the data necessary to fully characterize the risk.

In the golf course area (sites 1, 3, 4, 5, 10, and 12), organics contamination (trichloroethylene [TCE] and benzene) of groundwater at site 1 and metals contamination of surface soils at site 5 may pose a risk to human health. Groundwater contamination (TCE and benzene) in the industrial wastewater treatment plant (IWTP) area (sites 7, 13,

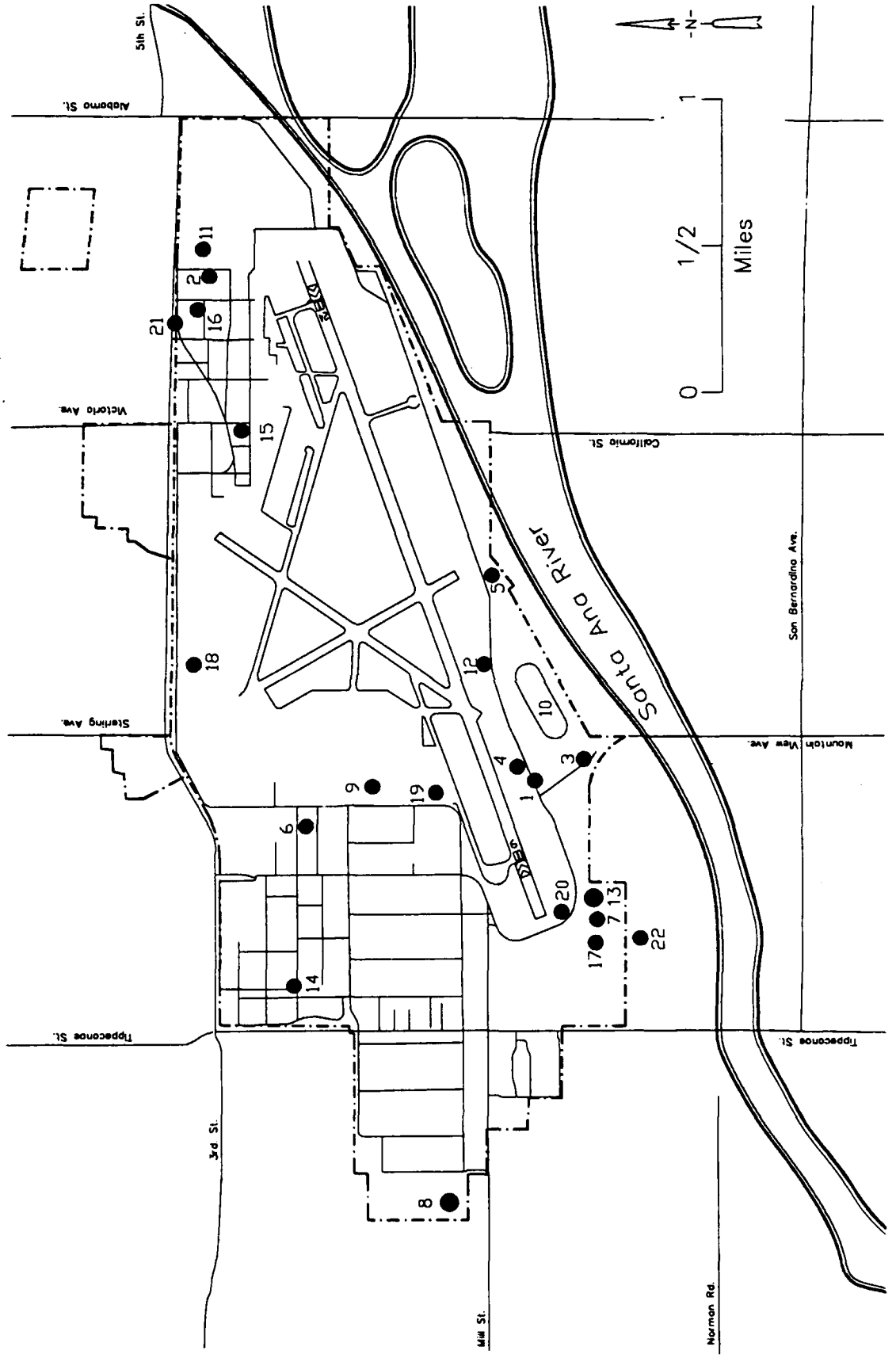


FIGURE 3.3 Installation Restoration Program Sites at Norton AFB (see Table 3.1 for the site names) (Source: Locations from Ecology and Environment 1988)

17, 20, and 22) may also pose health risks as well as the potential for migration to nearby Gage Company drinking water wells. In addition, metals contamination of surface soils at site 13 has the potential for health risks, and organics contamination of subsurface soils poses the potential of migration to area groundwater. In the central base area (sites 6, 9, 14, and 19), groundwater contamination (mainly with organics) may pose health risks and metals contamination of subsurface soils at site 9 could migrate to the groundwater.

Site 18 was found to have minor organics (TCE) and metals contamination of groundwater, but at levels not expected to produce adverse health effects. Site 8 was identified as posing no risk to human health.

The RI/FS concluded that groundwater contamination at the base presents a health concern due to the heavy use of area groundwater for drinking water supplies. In some cases, present supplies may be threatened; in addition, future supplies could be threatened if the current contamination is not mitigated.

3.2.1.3 Underground Storage Tanks

The current inventory of underground storage tanks (USTs) at Norton AFB includes 77 active tanks and 33 inactive tanks. The tanks have been used primarily for storage of various petroleum products, both virgin and used. The locations of these tanks are illustrated in Fig. 3.4, and a listing of tanks is given in Tables 3.2 and 3.3.

Fiscal year 1989 DERA funds are being used to remove 26 of the 33 inactive tanks. The seven remaining tanks will be closed in accordance with applicable regulatory requirements for permanent closure of USTs. The Air Force has also funded a leak detection plan for all active tanks. Active UST leak detection will be implemented by annual precision tank tightness testing coupled with monthly inventory control.

As soon as the tank tightness testing results are available, the Air Force will develop a plan to manage the tanks. This plan will be submitted for approval to San Bernardino County officials, the regulatory authority for this issue.

3.2.2 Air Resources

3.2.2.1 Meteorology

The potential for episodes of high air-pollutant concentrations in the San Bernardino Valley is substantially influenced by the meteorological conditions of the area and the emissions of precursor pollutants from the surrounding air basin. Important meteorological parameters include wind speed, wind direction, depth of the mixing layer (determined by the height of the inversion base), and solar intensity (which promotes photochemical smog formation).

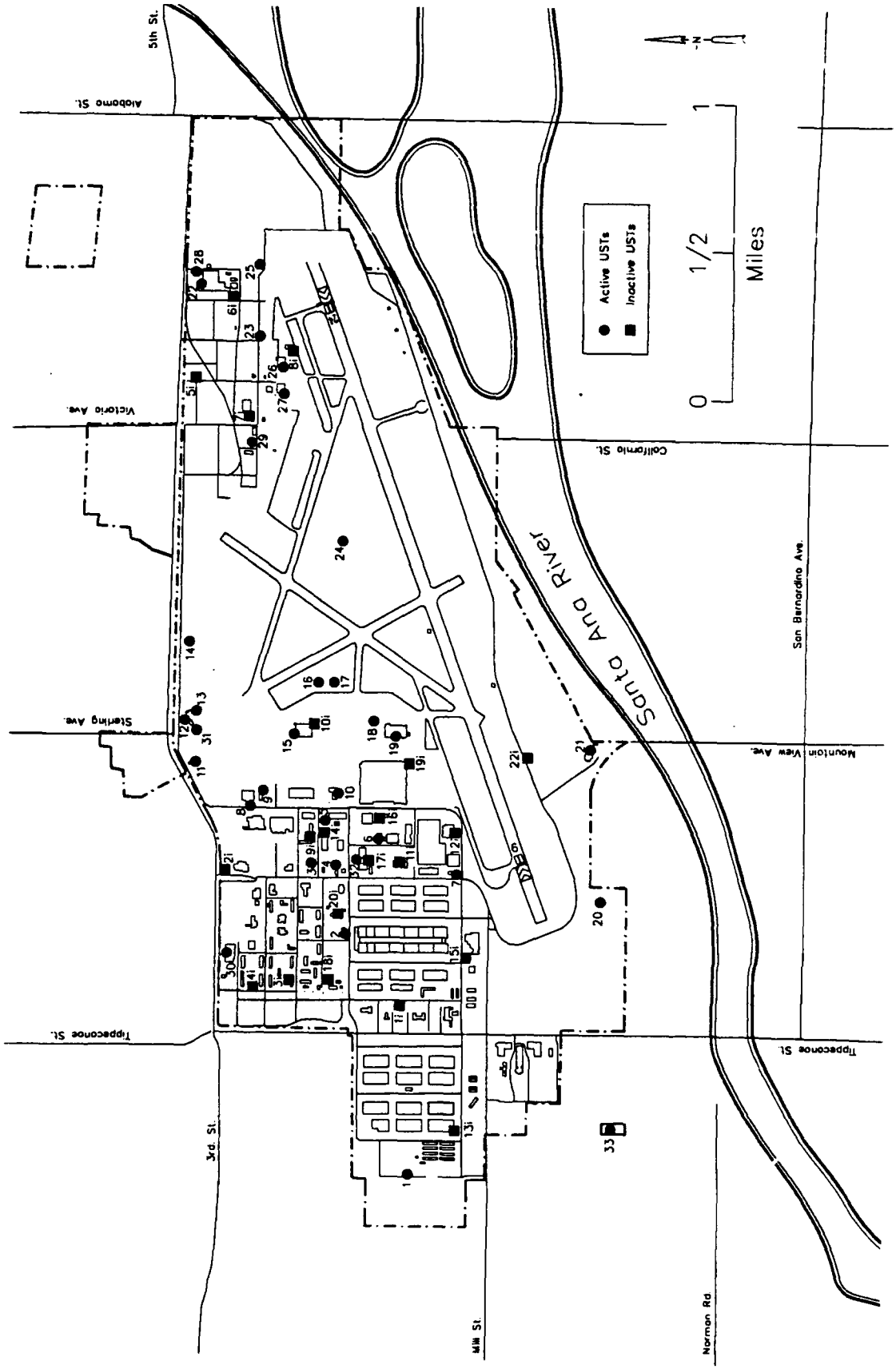


FIGURE 3.4 Locations of Underground Storage Tanks at Norton AFB (see Tables 3.2 and 3.3 for descriptions of the tanks) (Source: Norton AFB 1988b)

TABLE 3.2 Inventory of Active USTs (as of Oct. 27, 1988)[a]

Site	Location (Fac. No.)	No. of Tanks	Total Capacity (gal)	Contents
1	984	1	500	Heating fuel No. 2
2	468	2	10,000	Diesel fuel
3	620	5	10,000	Gasoline
		1	550	Waste oil
4	617	1	1,000	Motor gasoline
5	650	2	25,000	Gasoline
		1	25,000	Diesel fuel
		2	50,000	Fuel oil No. 2
6	757	2	500	Waste oil
7	716	2	25,000	Fuel oil No. 2
		3	50,000	Fuel oil No. 2
8	672	1	4,000	Fuel oil No. 2
9	675	2	12,500	Diesel fuel
		1	5,000	JP-4
		1	10,000	Gasoline
10	680	1	550	Waste oil
11	803	1	2,000	Slop tank (normally empty)
		6	50,000	JP-4
12	819	1	2,000	Slop tank
13	823	1	5,000	Waste fuel
14	805	1	2,000	Waste fuel
15	697	2	10,000	Fuel oil No. 2
16	804	1	2,000	Waste fuel (normally empty)
		8	50,000	JP-4
17	809	1	2,000	Waste fuel (normally empty)
		8	50,000	JP-4
18	794	1	500	Diesel fuel (new, never used)
19	795	1	750	Diesel fuel
20	1264	1	1,200	Motor gasoline
21	818	1	2,000	Fuel oil No. 2
22	249	3	30,000	Fuel oil No. 2
23	2333	1	10,000	JP-4
24	844	1	1,000	Diesel fuel
25	863	1	300	Diesel fuel
26	333	1	1,000	Fuel oil No. 2
27	341	1	500	Fuel oil No. 2
28	245	2	1,600	Photoprocessing waste sumps
29	289	1	150	Motor gasoline
30	100	1	550	Fuel oil No. 2
31	820	1	300	Waste fuel
32	726	1	500	JP-4
33	3101	1	550	Diesel fuel
Total		77		

[a]Excluded are three tanks at the IWTP (Bldg. 1264): primary clarifier tank, flocculation tank, and ozonator tank.

Source: Norton AFB (1988b).

TABLE 3.3 Inventory of Inactive USTs (as of Jan. 25, 1988)

Site	Location (Fac. No.)	No. of Tanks	Total Capacity (gal)
1i	S-21	1	350
2i	S-38	1	1,000
3i	142	1	500
4i	169	1	550
		3	10,000
5i	222	1	1,000
6i	226	2	10,000
7i	302	1	6,000
8i	335	1	2,000
9i	645	1	750
10i	695	1	1,000
11i	705	1	550
		1	5,000
		1	2,000
12i	749	1	6,000
13i	948	1	3,000
14i	650[a]	3	25,000
15i	514	1	12,000
16i	754	2	30,000
17i	726	2	500
18i	427	1	300
19i	763	1	1,000
20i	477	2	250
21i	245	1	1,600
22i	811	1	350
Total		33	

[a]Tanks 2C, 2E, and 2F.

Source: Norton AFB (1988b).

As described in Section 3.1.1, westerly breezes prevail during the summer months when the sun is highest and days longest. With westerly winds, large quantities of precursor emissions from the coastal sections of southern California are transported into the area and, with strong insolation, maximum amounts of photochemical smogs are produced. Conversely, the easterly breezes prevail during winter months when the nights are longest. With easterly winds, the area becomes the source, rather than the receptor, of pollutants in the coastal areas.

The San Bernardino Valley, like most of the areas in coastal southern California, experiences a low-level temperature inversion during most of the year. The height of the inversion base determines the maximum depth of space available for the mixing and dilution of pollutants. During winter months, early morning inversion bases are initially at the surface on an average of two out of three mornings, but a vertical mixing layer extends to about 4,000 ft by early afternoon, lifting the relatively weak inversion layers or eroding them entirely by convective currents from surface heating. This situation typically allows an accumulation of primary pollutants such as carbon monoxide (CO), nitrogen oxides (NO_x), and lead (Pb) during the early morning hours, with rapid improvement in air quality by early afternoon as the trapped pollutants are allowed to disperse.

During summer months, the height of the early morning inversion base (or mixing layer) averages about 1,400 ft. The afternoon mixing layer extends to only about 2,800 ft, since the summer inversion layers are stronger, more persistent, and less prone to be entirely eroded by surface heating. Consequently, summertime concentrations of most primary pollutants are usually lower than those of winter. Photochemical oxidant concentrations, however, are much higher in summer than in winter. During summer, more solar radiation is available to drive photochemical reactions, and the afternoon vertical mixing layer is far lower than that during winter, which contributes to higher levels of ozone and other pollutants in this season.

3.2.2.2 Air Pollutant Emission Sources

Ambient air quality in the Norton AFB area is primarily influenced by the emissions from Norton AFB and its surrounding area, i.e., the South Coast Air Basin (SCAB). The SCAB includes the nondesert portions of Los Angeles, Riverside, and San Bernardino counties and all of Orange County.

The major sources of emissions associated with Norton AFB include aircraft flight and maintenance operations, motor vehicle operations, boilers and furnaces, fire training exercises, painting and metal cleaning operations, aircraft engine testing, and stationary internal combustion engines. A summary of emissions contributed by each source category is provided in Table 3.4. Emissions data for the individual stationary emission sources were obtained from a summary of emissions data prepared by Norton AFB for the South Coast Air Quality Management District and a volatile organic compound emissions inventory prepared by Argonne National Laboratory for Norton AFB (Cuscino and Spessard 1988). The emission factors used in compiling the emissions inventories in the data sources were in general either AP-42 emission factors (EPA 1985)

TABLE 3.4 Emissions of Air Pollutants from Sources Associated with Norton AFB, 1987-1988 (lb/day)

Source Category	Reactive Organic Gas (ROG)	Nitrogen Oxides (NO_x)	Carbon Monoxide (CO)	Sulfur Dioxide (SO_2)	Suspended Particulates (TSP)	Particulate Matter ≤10 μm (PM_{10})
Stationary Sources						
Boilers, furnaces, and incinerators (11)[a]	1.3	481.5	35.2	3.6	2.7	2.7
Internal combustion engines (3)	3.2	39.8	8.7	2.6	2.8	2.7
Jet engine testing (1)	33.3	30.0	42.9	3.0	2.6	2.5
Fire training exercises	66.3	1.0	70.6	0.3	67.5	65.5
Painting and metal cleaning operations (12)	175.6	0	0	0	0	0
Printing operations	8.3	0	0	0	0	0
Fuel storage and handling (13)	48.8	0.7	0.1	0	0	0
JP-4 fuel spills	10.6	0	0	0	0	0
Herbicides and insecticides	0.6	0	0	0	0	0
Wastewater treatment plant	3.9	0	0	0	0	0
Subtotal	351.9	553.0	157.5	9.5	75.6	73.4
Mobile Sources						
Aircraft						
Flight operations						
Assigned aircraft	7,571.9	912.2	9,564.0	185.1	68.5	66.9
Transient aircraft	371.9	169.0	728.4	19.9	6.5	6.3
Engine maintenance	806.9	737.7	1,035.2	70.4	55.4	54.1
Motor vehicles[b]						
Assigned vehicles	51.7	94.1	430.8	4.7	27.7	21.7
Commuting vehicles	332.6	279.6	3,260.8	16.4	192.9	131.9
Delivery trucks	75.0	370.3	827.7	17.4	75.7	66.8
Subtotal	9,210.0	2,562.8	15,846.9	313.9	426.7	347.7
Total	9,561.9	3,115.8	16,004.4	323.4	502.3	421.1

[a]Numbers in parentheses indicate the number of permitted emission sources in the category.

[b]Lead emissions from motor vehicle operations are 0.62 lb/day.

Sources: Norton AFB (1989a-c); Cuscino and Spessard (1988); Rodriquez (1989); Choy (1989); Baldwin (1989); Pasha (1989); Alcock (1989).

or emission factors provided by the South Coast Air Quality Management District. When base personnel could provide more recent data for stationary sources, these data were used. Table 3.4 also lists the number of emission sources in each source category with valid permits from the South Coast Air Quality Management District. All permitted sources (40) are currently in compliance with the district's stack testing and other permit requirements. In addition, 37 permit applications for various emission sources are currently pending.

Emissions associated with aircraft operations were estimated using the emissions factors compiled by Seitchek (1985) and Norton AFB operations data for 1987. Emissions associated with aircraft engine maintenance were estimated using emission factors from Seitchek (1985) and frequency-of-maintenance and other maintenance data from Norton AFB.

Emission factors used for estimating vehicular emissions were derived from the projected 1990 vehicular emissions data and other traffic-related data for San Bernardino County obtained from the California Air Resources Board (CARB 1989). Vehicular activities (measured in vehicle-miles traveled) for trips to and from Norton AFB were based on (1) the estimated number of vehicles operated by the base employees and military retirees residing in the Norton AFB area, considering car pooling; (2) the estimated frequencies of employee commuting and retiree visits to the commissary at Norton AFB; and (3) the distances estimated from the distribution of employee residences by zip code (see Section 3.4.5.3). Emissions from vehicles assigned to Norton AFB were based on (1) the number of vehicles assigned by vehicle type and (2) annual fuel consumption and vehicle-miles traveled. Truck activities were estimated from the average number of truck deliveries per day and the average distance between Norton AFB and the origins of shipments as supplied by base personnel.

The annual total emissions from all categories of sources associated with Norton AFB during the period 1987-1988 were about 8.0 tons/day of CO; 4.8 tons/day of reactive organic gases (ROG)*; 1.6 tons/day of NO_x; 0.25 tons/day of total suspended particulates (TSP), which includes 0.21 tons/day of particulate matter with aerodynamic diameters equal to or less than 10 um (PM_{10}); 0.16 tons/day of sulfur dioxide (SO_2); and 0.7 lb/day of Pb.

Daily quantities of air pollutants emitted in 1985 from the SCAB and the SCAB portions of San Bernardino and Riverside‡ counties are listed in Table 3.5 along with those estimated for the sources associated with Norton AFB during the period 1987-1988. The significance of the emissions from the portions of San Bernardino and Riverside counties within SCAB is expressed as a percentage of the total SCAB emissions, and that of the emissions associated with Norton AFB as percentages of the emissions from San Bernardino County (SCAB portion) and SCAB. The emissions from

*Hydrocarbons that contribute to ozone formation.

‡Most of the aircraft currently assigned to Norton AFB are to be transferred to March AFB, which is also located in the SCAB portion of Riverside County.

TABLE 3.5 Emissions of Air Pollutants from the South Coast Air Basin, San Bernardino and Riverside Counties, and Norton AFB

Pollutant	SCAB (tons/day)[a]	SCAB Portion of San Bernardino County (SBC)		SCAB Portion of Riverside County		Norton AFB		
		tons/day[a]	% of SCAB	tons/day[a]	% of SCAB	tons/day[b]	% of SCAB	% of SBC
ROG	1,246.4	108.0	8.7	79.5	6.4	4.78	0.38	4.43
NO_x	1,039.8	85.1	8.2	54.2	5.2	1.56	0.15	1.83
CO	5,430.0	409.0	7.5	323.6	6.0	8.00	0.15	1.96
SO_2	121.1	5.8	4.8	3.3	2.7	0.16	0.13	2.76
TSP	1,645.2	141.5	8.6	137.8	8.4	0.25	0.02	0.18

[a]Source: South Coast Air Quality Management District (1988).

[b]From Table 3.4.

the SCAB portion of San Bernardino and Riverside counties account for about 8% and 6% of the SCAB emissions, respectively. The emissions associated with Norton AFB account for a small fraction of the emissions produced in its surrounding area, that is, about 2.0% of the emissions from the SCAB portion of San Bernardino County and about 0.16% of the total SCAB emissions.

3.2.2.3 Air Quality

Ambient air quality has not been monitored within the boundary of Norton AFB. The nearest ambient air quality monitoring stations are located in the cities of San Bernardino (about 3.7 mi northwest), Redlands (about 5.6 mi southeast), and Riverside (about 12.3 mi southwest). Levels of all criteria air pollutants (ozone, CO, NO_2, SO_2, TSP and PM_{10}, and Pb) and sulfate (SO_4) are monitored at the San Bernardino and Riverside stations. The Redlands station has measured only ozone levels since 1987. The approximate locations of these monitoring stations are shown in Fig. 3.5.

Table 3.6 provides a summary of the ambient air quality monitored at San Bernardino, Redlands, and Riverside during 1988; the table also lists applicable National and California Ambient Air Quality Standards (NAAQS and CAAQS, respectively). The CAAQS are in general more stringent than the NAAQS. As the data indicate, the greatest air quality problem in the vicinity of Norton AFB, as well as in the entire SCAB, is ozone. For the three stations, the California standard for ozone was exceeded on 173-178 days in 1988, about one-half of the days in the year. The exceedances are far more prevalent during summer, indicating almost continuously excessive ozone levels. During 1988, levels of PM_{10} (measured every six days) exceeded the California standard 40-51 times, or over 70% of the observations, at the two monitoring stations near Norton AFB. In contrast to ozone and PM_{10}, the levels of other air pollutants are relatively low. The CAAQS and NAAQS for CO, NO_2, SO_2, and Pb have not been exceeded during the last five years (CARB 1984-1988 -- see Section B.1 in App. B). The California SO_4 standard was also not exceeded during the same period.

The SCAB portion of San Bernardino County, which includes Norton AFB, is currently designated as in attainment for the NAAQS for SO_2 but nonattainment for ozone, CO, NO_2, and TSP (which includes PM_{10}) (40 CFR 81.305). Although not formally identified as such, this area is in attainment for Pb, but in nonattainment for PM_{10} (Goldberg 1989). The area's designation under the CAAQS has recently been adopted by CARB. The designations are in attainment for CO, SO_2, and Pb; in nonattainment for ozone, NO_2, PM_{10}, and SO_4; and unclassified for hydrogen sulfide (HS_2) and visibility-reducing particles (Range 1989).

The data evaluated (App. B) indicate that the ambient levels of ozone, CO, NO_2, SO_2, PM_{10}, and sulfate in the vicinity of Norton AFB did not show any significant increasing or decreasing trends during the last five years. The only air pollutant with a definite downward trend during the last five years is Pb. In addition, the air quality trends for the three stations discussed, which are located on different sides of Norton AFB, are similar, leading to the conclusion that the air quality patterns are similar throughout the Norton AFB area.

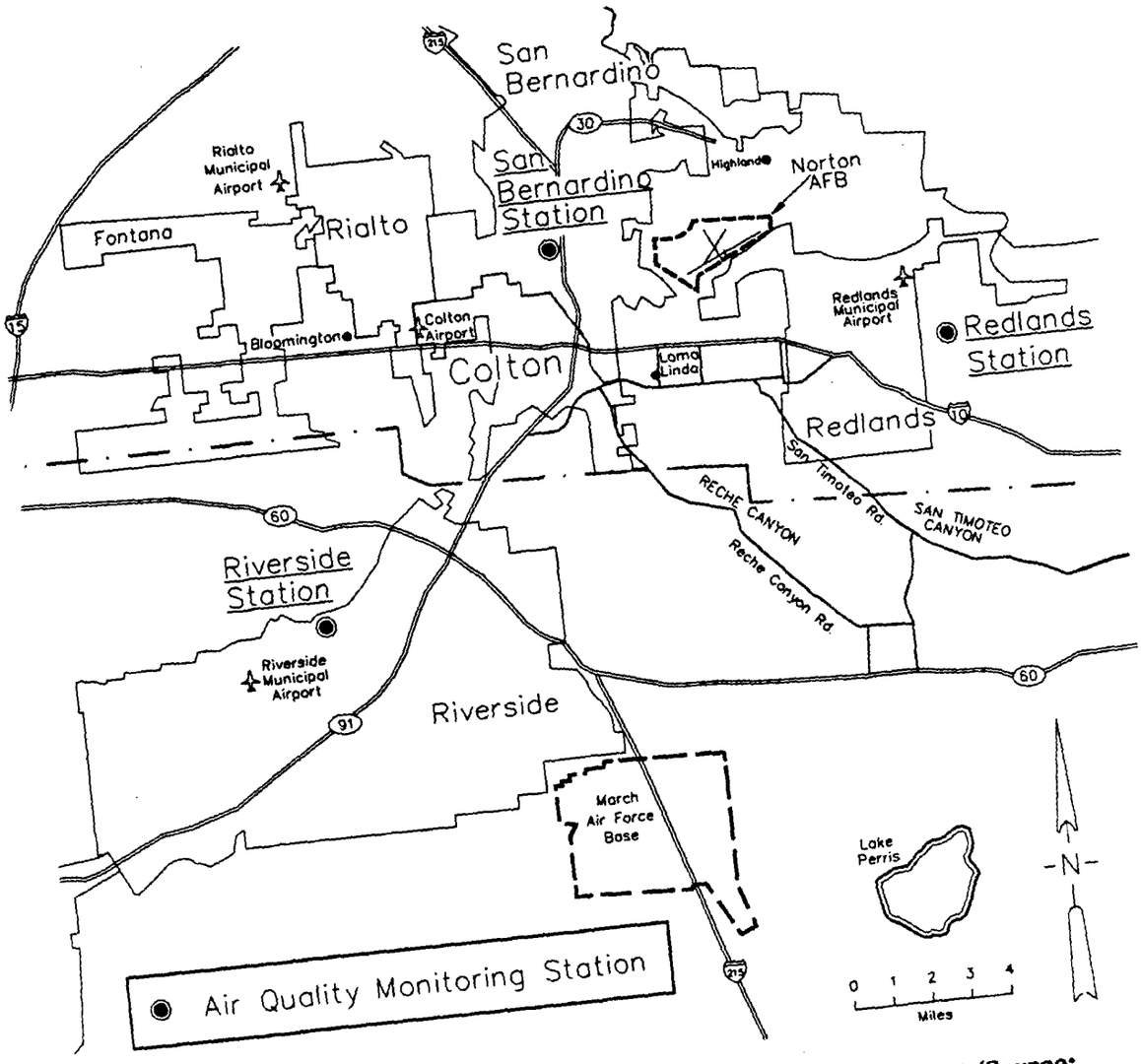


FIGURE 3.5 Ambient Air Quality Monitoring Stations near Norton AFB (Source: Locations from CARB 1984-1988)

TABLE 3.6 Summary of Ambient Air Quality Data from the Vicinity of Norton AFB in 1988

Pollutant	Parameter Measured	Unit	Averaging Period	San Bernardino	Redlands	Riverside	Standard CAAQS	Standard NAAQS
Ozone	1st high	ppm	1 hour	0.28	0.29	0.28	0.09	0.12
	2nd high	ppm	1 hour	0.26	0.28	0.25		
	Days ≤ CAAQS	No.	1 hour	173	176	178		
	Days ≤ NAAQS	No.	1 hour	121	130	123		
CO	1st high	ppm	1 hour	9.0	-	9.0	20	35
	2nd high	ppm	1 hour	9.0	-	9.0		
	1st high	ppm	8 hours	7.6	-	6.8	9.0	9.0
	2nd high	ppm	8 hours	7.0	-	5.9		
NO_2	1st high	ppm	1 hour	0.19	-	0.19	0.25	
	2nd high	ppm	1 hour	0.17	-	0.18		
	Arithmetic mean	ppm	1 year	0.042	-	0.037	-	0.05
SO_2	1st high	ppm	1 hour	0.02	-	0.02	0.25	-
	2nd high	ppm	1 hour	0.02	-	0.02		
	1st high	ppm	24 hours	0.012	-	0.012	0.05	0.14
	2nd high	ppm	24 hours	0.009	-	0.011		
	Arithmetic mean	ppm	1 year	0.002	-	0.001	-	0.03
PM_{10}	1st high	$\mu g/m^3$	24 hours	289	-	252	50	150
	2nd high	$\mu g/m^3$	24 hours	171	-	177		
	Samples > CAAQS	No.	24 hours	40	-	51		
	Samples > NAAQS	No.	24 hours	3	-	7		
	Observations	No.		56	-	61		
	Geometric mean	$\mu g/m^3$	1 year	66.8	-	81.8	30	-
	Arithmetic mean	$\mu g/m^3$	1 year	80.2	-	94.9	-	50
Pb	1st high	$\mu g/m^3$	30 days	0.12	-	0.10	1.5	-
	1st high	$\mu g/m^3$	cal. qtr.	0.08	-	0.17	-	1.5
SO_4	1st high	$\mu g/m^3$	24 hours	15.8	-	23.6	25	-
	2nd high	$\mu g/m^3$	24 hours	15.0	-	13.1		

Source: CARB (1984-1988).

3.2.3 Water Resources

Unless indicated otherwise, the source of water resource information is Ecology and Environment (1988).

3.2.3.1 Groundwater

Norton AFB is located within the 110-mi^2 Bunker Hill groundwater basin. This basin is recharged predominantly by runoff from the San Bernardino Mountains. Recharge also occurs by groundwater inflow from the San Timoteo Basin to the southeast and by penetration of surface water. Discharge from the basin occurs from flow into the Rialto-Colton groundwater basin to the southwest and from extraction by groundwater wells. The basic structure of the basin is three water-bearing zones separated by three confining zones. Figure 3.6 illustrates the elevation of the upper aquifer and the general groundwater flow direction from northeast to southwest.

In the vicinity of Norton AFB, the combined middle and lower water-bearing zones and lower confining member function as a single aquifer beginning at a depth of about 650 ft and extending below that for 500-700 ft. This aquifer serves as the source of groundwater extracted for use on the base and in the surrounding communities. Water

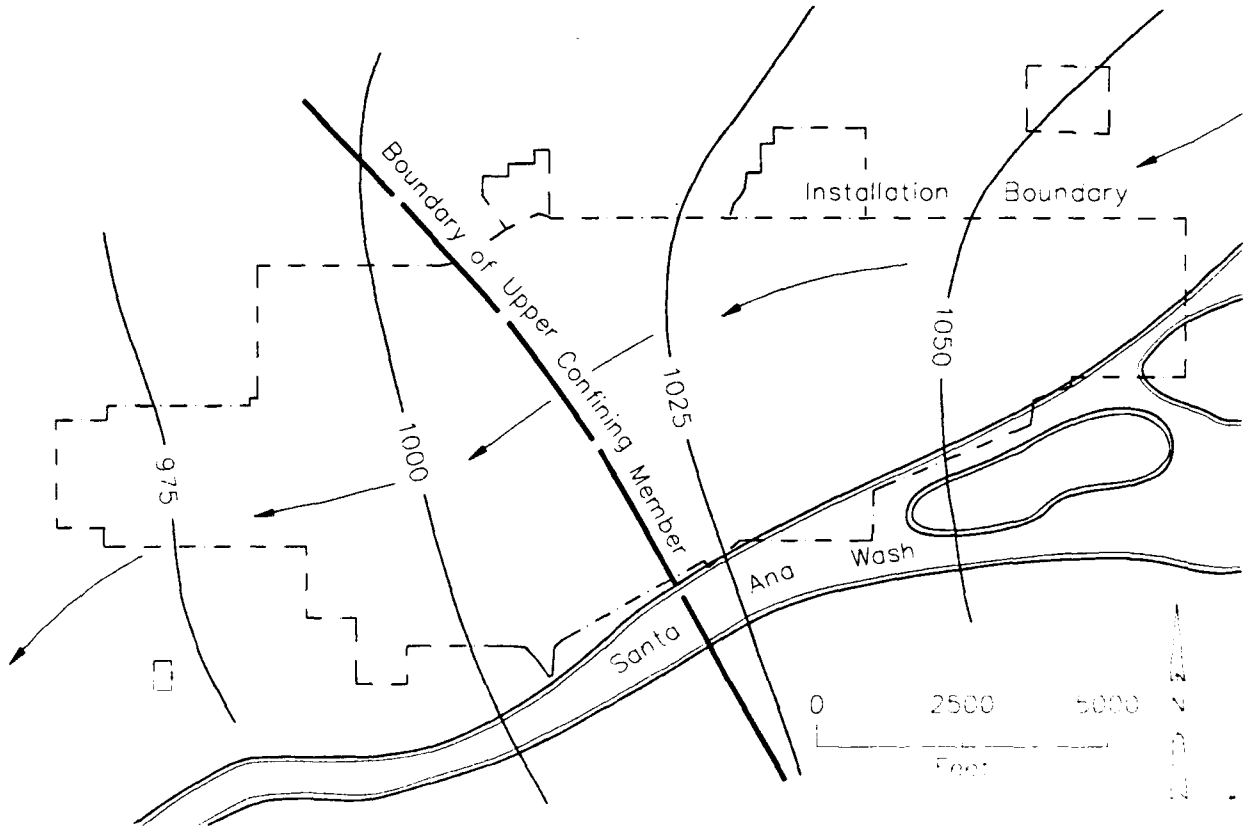


FIGURE 3.6 Groundwater Elevation (ft) of the Upper Aquifer and General Groundwater Flow near Norton AFB (Source: Adapted from Engineering Science 1982)

wells on the Norton AFB property and in the immediate vicinity are illustrated in Fig. 3.7. The current annual water consumption by Norton AFB is estimated as 840 million gal per year produced by on-site wells for use by the base units. An additional 50 million gal per year is purchased from surrounding communities for use by base housing.

Historically, this area has had ample water supplies. Prior to development in the 1800s, bogs and marshes occurred in the basin, including areas on the eastern portions of the current Norton AFB site. This abundant water supply led to heavy development with resultant sharp declines in groundwater levels. A combination of above-normal rainfall in winter and improved water management over the past 10 years has resulted in a return to somewhat higher groundwater levels.

Drinking water derived from deeper aquifer zones is generally of good quality. In base wells, silver in the range of 11-29 micrograms per liter (µg/L) has been detected, as has trichloroethylene at 1.5-6.2 µg/L. In addition, the Gage Canal Company wells, which serve the city of Riverside and are located immediately south of the base (see Fig. 3.7), have exhibited trichloroethylene concentrations ranging from 0.17 to 2.3 µg/L, according to the California Department of Health Services sampling and analyses conducted in 1980 and 1981. Also, perchloroethylene was detected in the same wells, with the 1980-1981 test results varying from 0.12 to 2.5 µg/L (Engineering Science 1982). The state of California drinking-water standards are 50 µg/L for silver and 5 µg/L for trichloroethylene; no standards are given for perchloroethylene (22 CAC). Therefore, monitoring data from the deep aquifer indicate that the trichloroethylene on the base can exceed the water quality standards.

3.2.3.2 Surface Water

Three stream channels are located in the vicinity of Norton AFB. The westward-flowing Santa Ana River adjoins the base along its southern boundary. City Creek to the north of the base (diverted to a concrete channel parallel to Third Street), along with a minor unnamed tributary to its west, flows westward into the third stream channel, Warm Creek. Figure 3.8 illustrates these streams, the surface drainage on the base, and the 100-year flood plain (defined as areas having a 1% probability of being inundated with flood water in any one year). The surface streams in this area are normally dry and convey water only during or immediately after heavy regional precipitation.

Controlled storm water drainage of the land area on North AFB generally consists of surface flow to diversion structures and then through collection pipes to local surface streams. There are 11 points for stormwater discharge around the boundary of the base. The point discharge that includes stormwater runoff from aircraft parking, maintenance, and servicing areas is regulated under National Pollutant Discharge System (NPDES) permit CA0002071. The point stormwater discharge that also previously included the IWTP discharge is regulated under NPDES permit CA0002062 (see Section 3.4.4.1).

The quality of surface water in the Santa Ana Basin, which comes from drainage from the crystalline terrain of the San Gabriel and San Bernardino Mountains, is generally excellent. Water from other surface sources -- drainage from the Chino Hills,

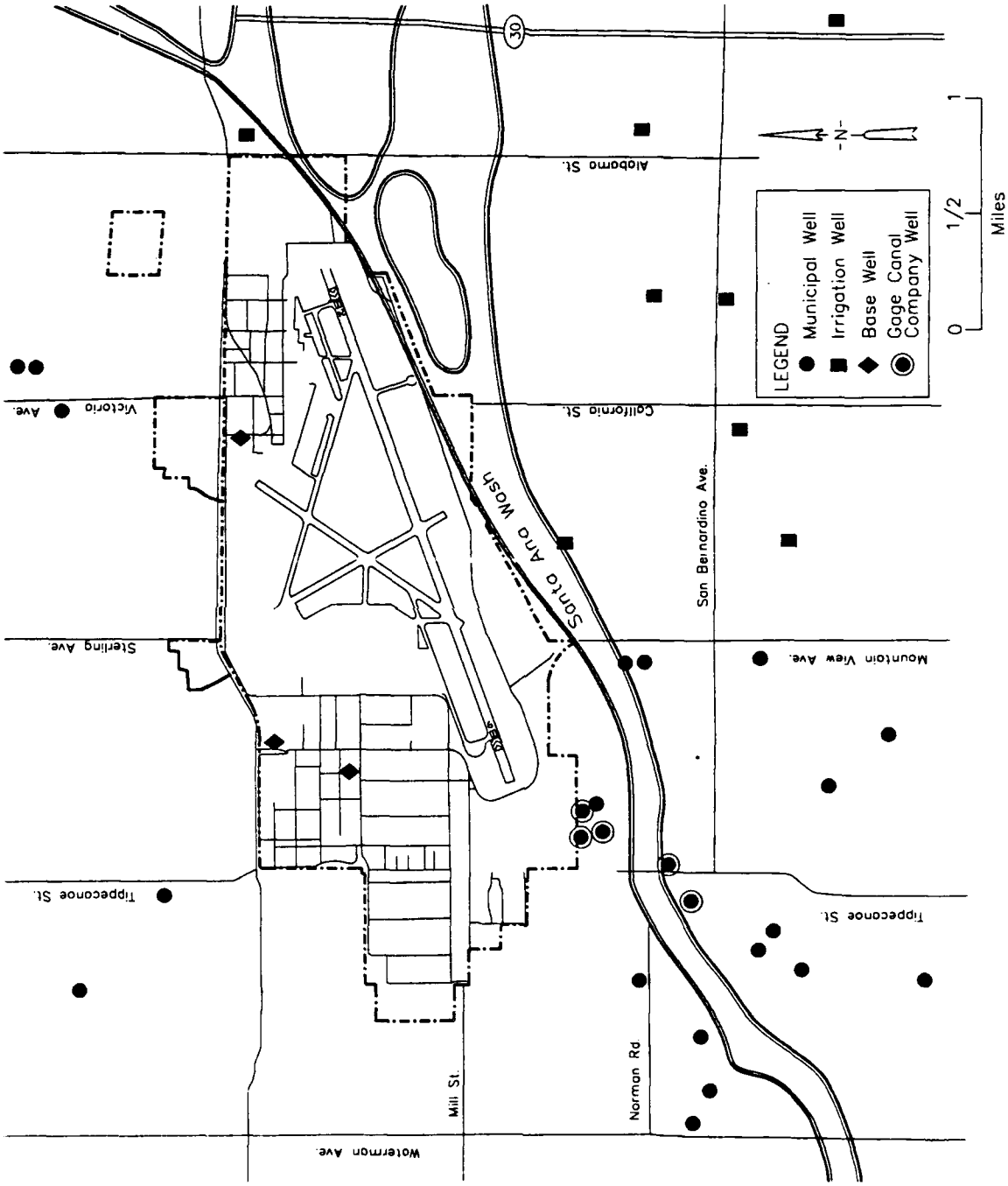


FIGURE 3.7 Water Wells at Norton AFB and in the Surrounding Area (Source: Adapted from Engineering Science 1982)

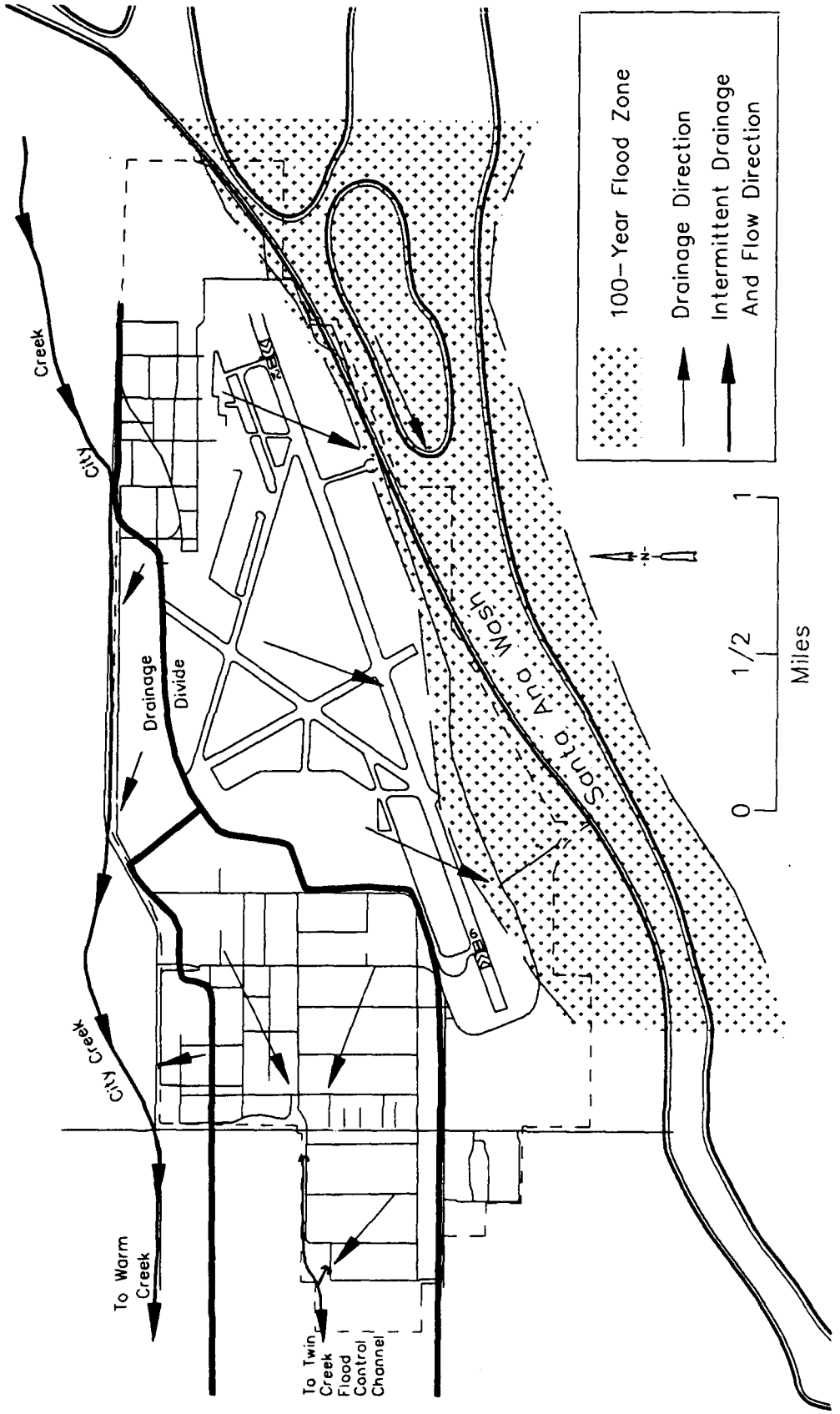


FIGURE 3.8 Surface Hydrology in the Norton AFB Area (Source: Adapted from Engineering Science 1982)

Santa Ana Mountains, and San Timoteo Badlands -- contains higher concentrations of dissolved solids but, when available, is still suitable for irrigation and other beneficial uses.

3.3 BIOLOGICAL ENVIRONMENT

3.3.1 Vegetative and Wildlife Resources

Norton AFB lies within the Californian Chaparral complex (Hanes 1977). The natural vegetation within this complex is typically dominated by foxtail and chamise, intermingled with wild oats, manzanita, ceanothus, and scrub oak. However, the vegetation at Norton AFB has been altered by past and ongoing construction, maintenance, and operational activities. Most of the vegetated areas are mowed and actively landscaped: little or no natural habitat remains. Landscaping on base includes a variety of shrubs and trees such as oleander, elm, mulberry, eucalyptus, Mexican fan palm, and California oak. Appendix C provides a list of plants that can be found on the natural and maintained areas at Norton AFB.

Mammals common to the habitat at Norton AFB include desert cottontailed rabbit, blacktailed rabbit, pocket gopher, ground squirrel, weasel, and deer mouse. Common bird species are meadowlark, gull, raven, crow, and starling. Reptiles that may be found on the base include rattlesnakes and horned lizards.

Several small ponds exist on the base; mallards, pintails, and coots have been observed using them. See App. C for a list of birds that have been observed at Norton AFB.

The Santa Ana River lies along Norton AFB's south and southeastern boundary; hence, part of the Santa Ana River floodway encroaches onto the south eastern portion of the base. Because the flow of the Santa Ana River is intermittent, fish and amphibians are not found in the area near Norton AFB.

3.3.2 Threatened and Endangered Species

The only federally listed threatened or endangered animal species known to occur near Norton AFB is least Bell's vireo (*Vireo bellii*). Bell's vireo is listed as an endangered species by both the FWS and the state of California (Harper 1989). This bird typically inhabits thickets, wood margins, and mesquite and may incidentally occur at the base.

One federally listed endangered plant that is known to occur in the floodplain of the Santa Ana River at Norton AFB is the Santa Ana River wooly-star (*Eriastrum densifolium sanctorum*). In addition, the endangered slender-horned spineflower (*Centrosteqia leptoceras*) may also occur on site.

Four candidate species (as defined by FWS Category 2*) may also occasionally occur at Norton AFB: the spotted bat (*Euderma maculatum*), San Diego horned lizard (*Phrynosoma coronatum blainvillei*), orange-throated whiptail (*Cnemidophorus hyerythrus*), and greenest tiger beetle (*Cincindela tranquebarica viridissima*). However, exact locations of these species' habitats have not been determined. MAC is arranging for an FWS survey, to take place in spring/summer 1990.

3.4 HUMAN ENVIRONMENT

The human environment at and surrounding Norton AFB is discussed in relation to archaeological, cultural, and historic resources; noise factors; hazardous materials; socioeconomic factors; transportation; and land use.

3.4.1 Archaeological, Cultural, and Historic Resources

MAC, the parent command for Norton AFB, has had a long-standing agreement with the National Park Service (NPS), under which the NPS provides technical advice. MAC received the NPS management recommendations for Norton AFB prior to the announcement regarding closure; MAC has asked the NPS to reevaluate its recommendations (for surveys, etc.) so that they reflect the effects of closure. As soon as those recommendations are available, MAC will use them as a basis for a formal consultation with the SHPO.

Based on the NPS recommendations to date, MAC expects to accomplish a survey of historic archaeological sites, with a lesser possibility of a prehistoric survey. Because of the NPS concerns regarding the potential significance of the World War II facilities on Norton AFB, these facilities are being evaluated under an ongoing DOD study. The study is being accomplished in accordance with a programmatic memorandum of agreement (PMOA) between the Advisory Council on Historic Preservation, National Council of State Historic Preservation Officers, and DOD.

A search of archaeological records for Norton AFB disclosed a survey, by non-Air Force sources, of part of the base. That survey revealed four historical archaeological sites located in the refuse disposal area (Ross 1989). In addition, further investigation is pending for four other sites; however, historical maps suggest that 21 other archaeological sites may be located on the base. Subsequent Air-Force-sponsored investigations will determine whether any sites are significant enough to be on the *National Register of Historic Places*.

*A Category 2 species is one that existing information indicates may warrant listing but for which substantial biological information to support listing is lacking in the area.

3.4.2 Noise

Noise levels resulting from existing aircraft operations at Norton AFB have been estimated as part of the Air Force Air Installation Compatible Use Zone (AICUZ) program. The AICUZ program is designed to provide updated information on the flight operations of the base, as well as land use compatibility guidelines, to assist local community planning efforts in dealing with the impacts of these operations. Estimated noise levels from aircraft using Norton AFB were most recently updated in 1987. This Norton AFB AICUZ report is available from the 63rd MAW Public Affairs Office, Norton AFB, upon request.

The AICUZ program uses various types of information to estimate noise levels, including types of aircraft, flight patterns, power settings, number of flight operations, and time of day or night. This information is used in the computer model NOISEMAP 5.2. The output of this analysis is expressed in terms of the day-night average sound level (Ldn) (see App. D).

The Ldn value represents the adjusted 24-hour average sound level, in decibels, for the period from midnight to midnight. The adjustment involves addition of 10 dB to sound levels occurring during the night (from 2200 to 0700 hours) to account for increased sensitivity to noise during normal sleeping hours. The EPA has adopted Ldn as the standard measure for estimating noise impacts.

Daily flight operations, the primary input data used to estimate noise levels, are summarized in Table 3.7. Figure 3.9 shows the flight tracks in the vicinity of Norton for aircraft taking off and landing at the Norton airfield. Runway 06 is used for 89.5% of the operations, and Runway 30 is used for the remaining 10.5%.

Transient aircraft uses of Norton AFB, which comprised about 45% of the flight operations in 1987, are primarily of the following types:

- Norton AFB has been designated as the principal arrival and departure airport for U.S. Army and Marine units rotating through their respective training facilities at Ft. Irwin and Twenty-nine Palms. Both commercial and Air Force aircraft are used in these transfers.

TABLE 3.7 Flight Operations at Norton AFB

Aircraft	Avg. No. of Operations[a] per Busy Day
Assigned	
C-141	102.94
C-21	9.22
C-12	9.20
Transient	
C-130	3.90
C-5A	0.92
T-37	1.08
T-38	1.86
DC-9	2.56
B-747	0.86
K/DC-10/L-1011	0.50
Business jet	0.84

[a]An operation is one takeoff and one landing combined.

Source: AFESC (1989).

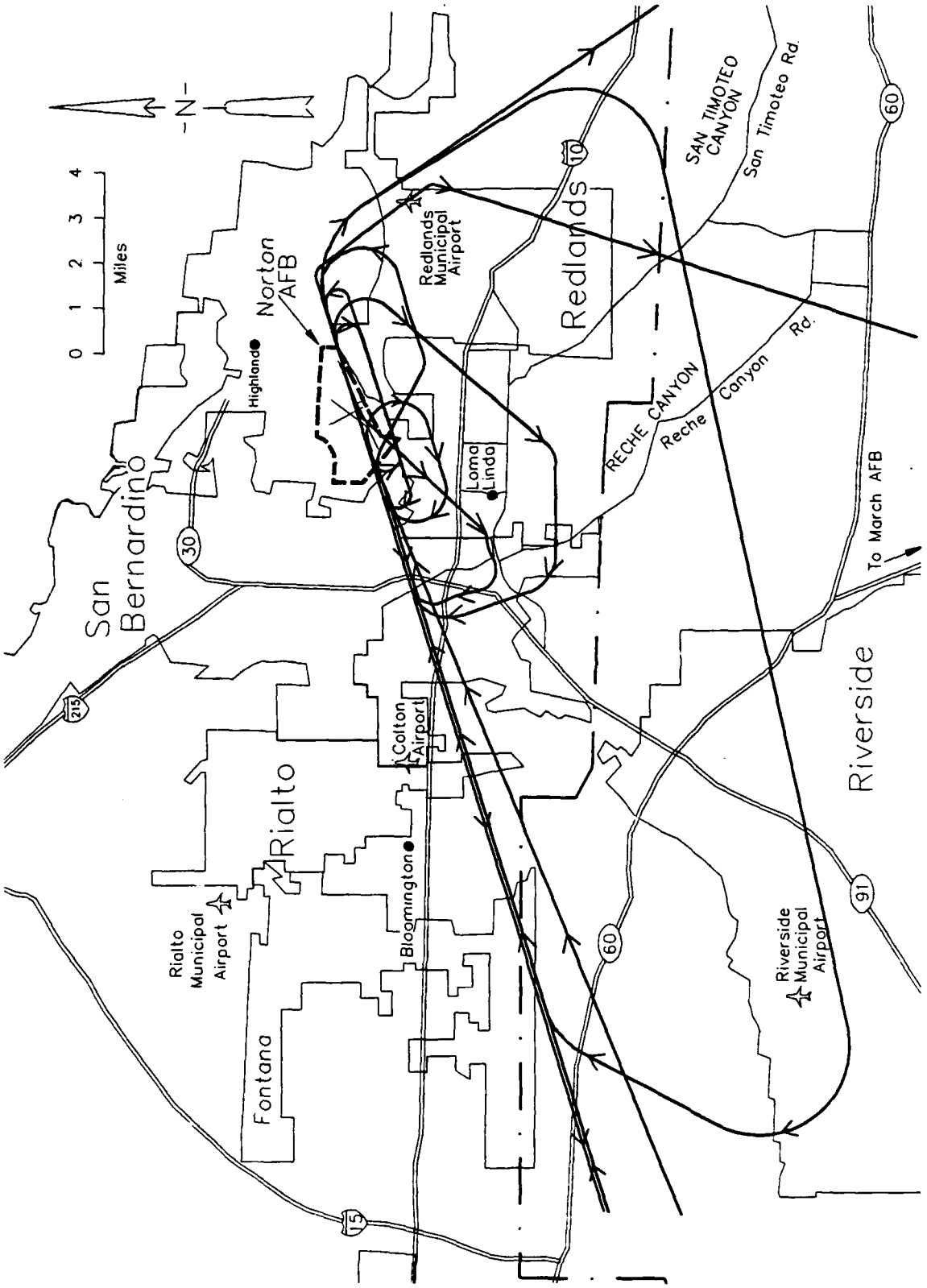


FIGURE 3.9 Flight Tracks for Aircraft Using Norton AFB (Source: Adapted from Norton AFB 1988c)

- Commercial carriers transit Norton AFB daily in their support of Air Force requirements for urgent movement of priority parts and supplies.

- In addition to the above, Norton AFB, like all other Air Force bases, frequently hosts a variety of aircraft on various missions for each of the military services.

Brief descriptions of military aircraft currently assigned to Norton AFB are given in App. A.

The estimated noise isopleths (Ldn) surrounding Norton AFB for existing aircraft operations are illustrated in Fig. 3.10. The isopleths primarily extend outward from the

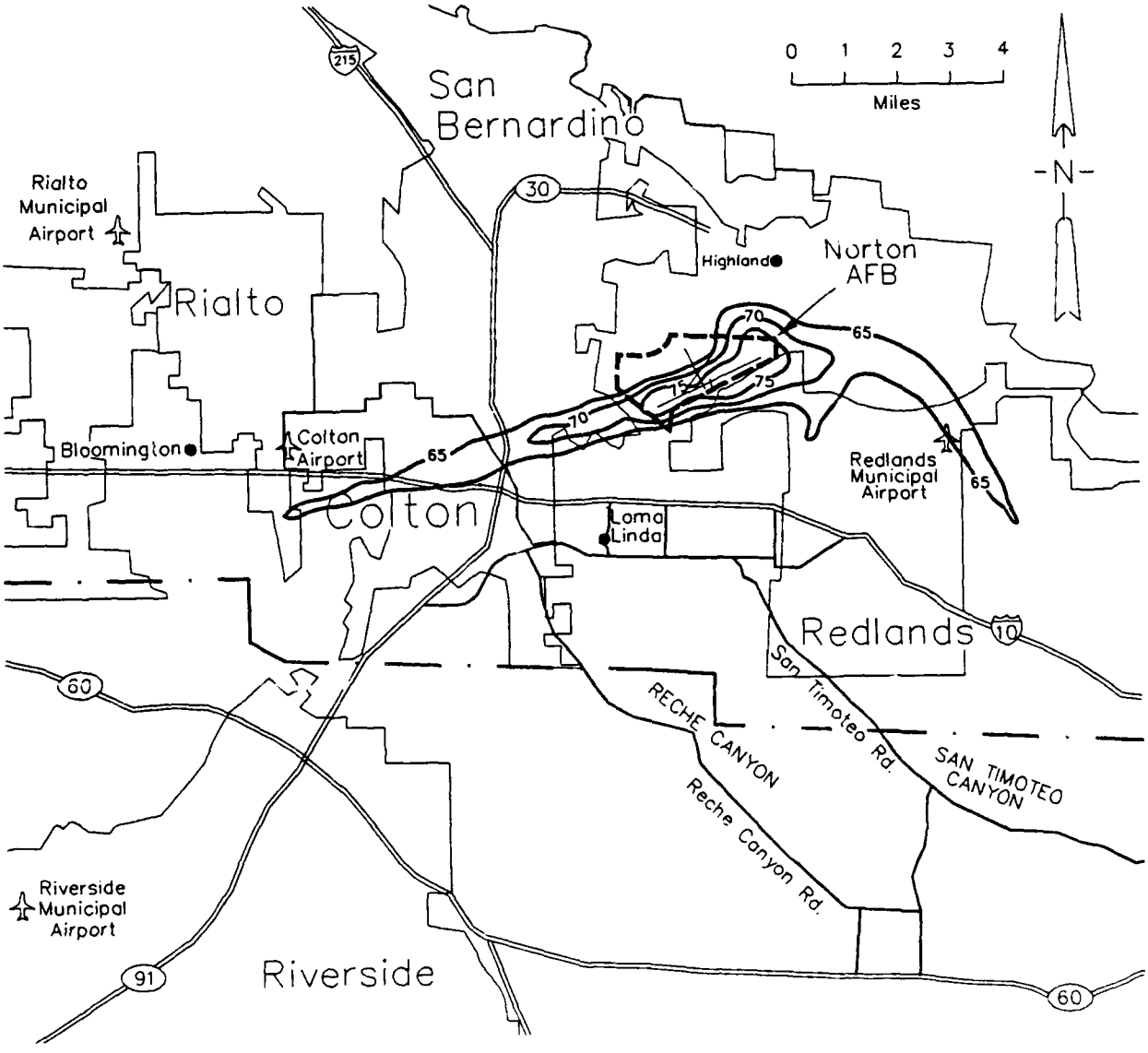


FIGURE 3.10 Estimated Noise Isopleths (Ldn) from Aircraft Using Norton AFB (Source: Adapted from Norton AFB 1988c)

base in the directions of the most frequent flight paths. The areas with estimated noise levels less than 65 dB are in general compatible with most land uses (see Table 3.8).

Residential development is discouraged in areas with estimated levels of 65-70 dB. If residential development does occur, the guidelines recommend construction designs that achieve a noise level reduction (NLR) of 25 dB. Most nonresidential land use is generally compatible with noise levels below 65 dB.

For areas with estimated noise levels of 70-75 dB, which are limited to within 2 mi of Norton AFB (primarily in the direction of extensions to the main runway), the guidelines recommend additional land use limitations or inclusion of higher NLRs in building construction design.

TABLE 3.8 Summary of Land Use Compatibility Guidelines[a]

Land Use Category	Guideline for Use of Area with Given Ldn Average Sound Level		
	70-75 dB	65-70 dB	<65 dB
Residential	NLR of 30 dB; use strongly discouraged	NLR of 25 dB; use discouraged	Compatible
Industrial/manufacturing	Compatible; NLR of 25 dB required for public areas	Compatible	Compatible
Transportation, communication, and utilities	Compatible; NLR of 25 dB required for public areas	Compatible	Compatible
Commercial retail trade	NLR of 25 dB	Compatible	Compatible
Cultural, entertainment, and recreation	Varies depending on specific use	Compatible	Compatible
Resource production and extraction	Compatible	Compatible	Compatible
Personal and business services	NLR of 25 dB	Compatible	Compatible

Source: Norton AFB (1988c).

Areas with estimated noise levels above 75 dB extend less than 1 mi from the base boundaries. These areas are incompatible with residential development; for other land uses, NLRs of 30 dB or more are recommended for buildings where the public is received, where office areas are located, or where the normal noise level is low.

The municipalities surrounding Norton AFB regularly submit zoning proposals to the Norton AFB community planning office for review. Recommendations on zoning that are compatible with noise guidelines are then provided to municipalities by Norton AFB. This process has successfully avoided most major conflicts with noise level zoning constraints. Some residential and commercial development has occurred within the 65- to 75-dB isopleths. The extent to which these developments follow the NLR guidelines (Table 3.8) is not known.

3.4.3 Aircraft Safety Factors

3.4.3.1 Accident Potential Zones and Building Height Limitations

The AICUZ program provides information on the relative potential for accidents in areas surrounding Norton AFB involving aircraft using the base. Air-Force-wide data for 658 aircraft accidents during the period 1968-1980 showed the areal distribution of accidents given in Fig. 3.11. Seventy percent of the accidents in this data base occurred in areas within 1,000 ft of the side of runways or in an area 3,000 ft wide extending 15,000 ft beyond the end of the runway. To ensure that incompatible land uses could not occur within the clear zone, the area of greatest noise and safety hazard, the Air Force acquired property rights to the clear zone acreage. The defined accident potential zones (APZs) project the accident potential relative to other zones but do not project the probability for an accident to occur. Also, the accident statistics are for all Air Force aircraft and are not specific to Norton AFB aircraft.

Based on these data, land use zones are defined in the vicinity of airfields as shown in Fig. 3.11 and illustrated for Norton AFB in Figs. 3.12 and 3.13. The land use compatibility guidelines for these zones are given in Table 3.9. Except for agriculture, fishing, or forestry activities requiring only low labor intensity, the clear zone is to

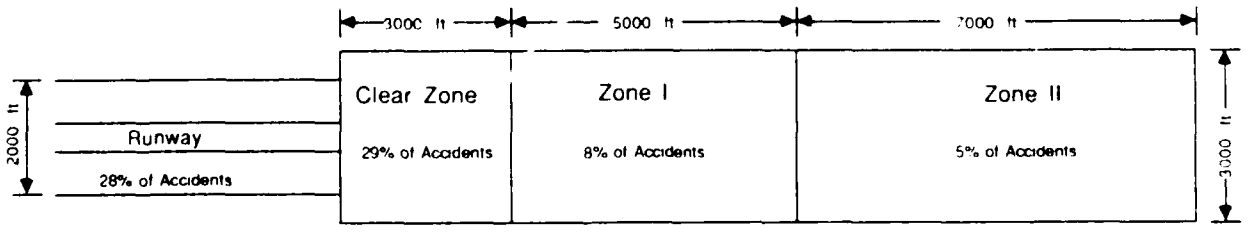


FIGURE 3.11 Statistical Distribution of Air-Force-Wide Accidents near Airfields (1986-1980) (Source: Adapted from Norton AFB 1988c)

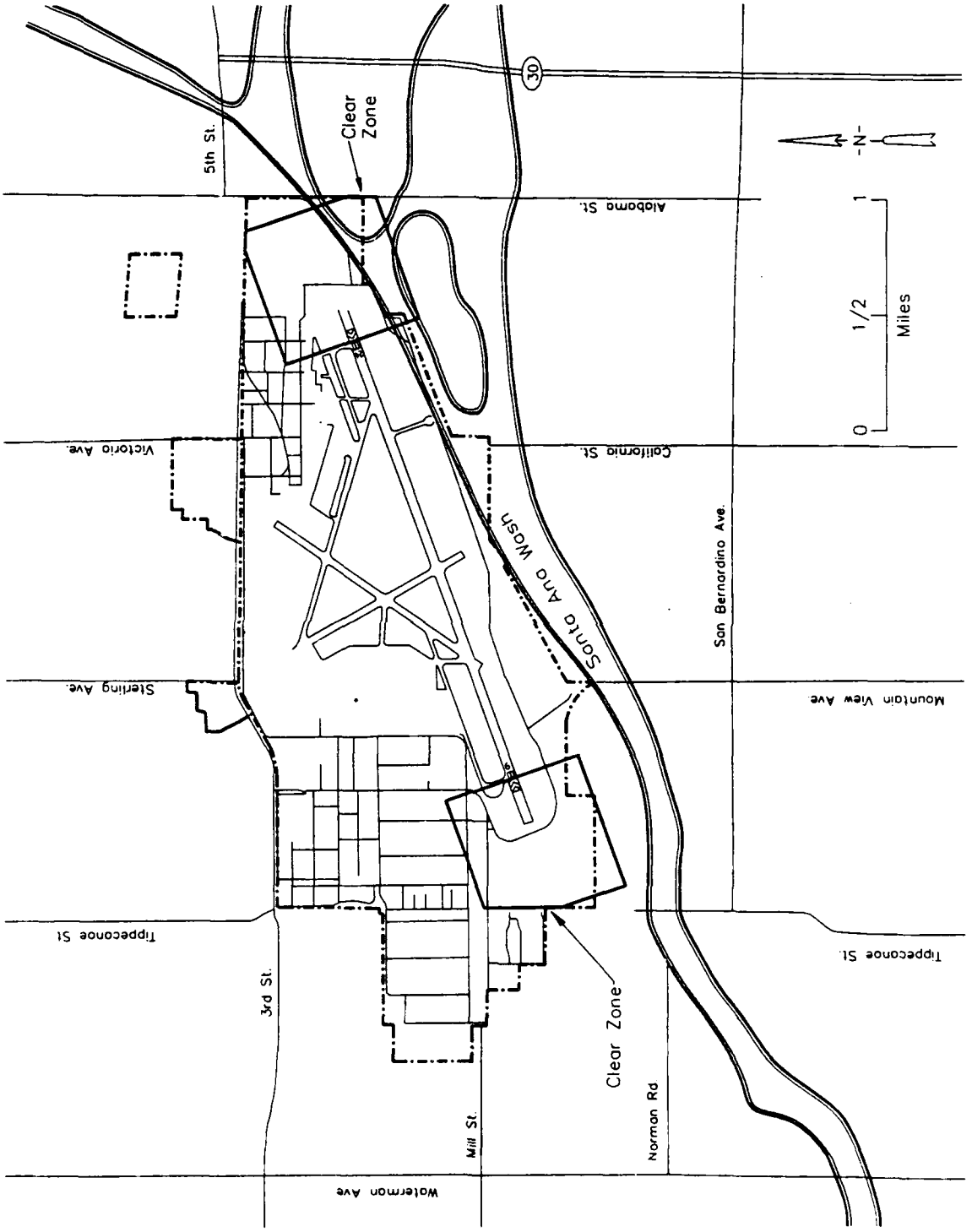


FIGURE 3.12 Clear Zones near Norton AFB (Source: Adapted from Norton AFB 1988c)

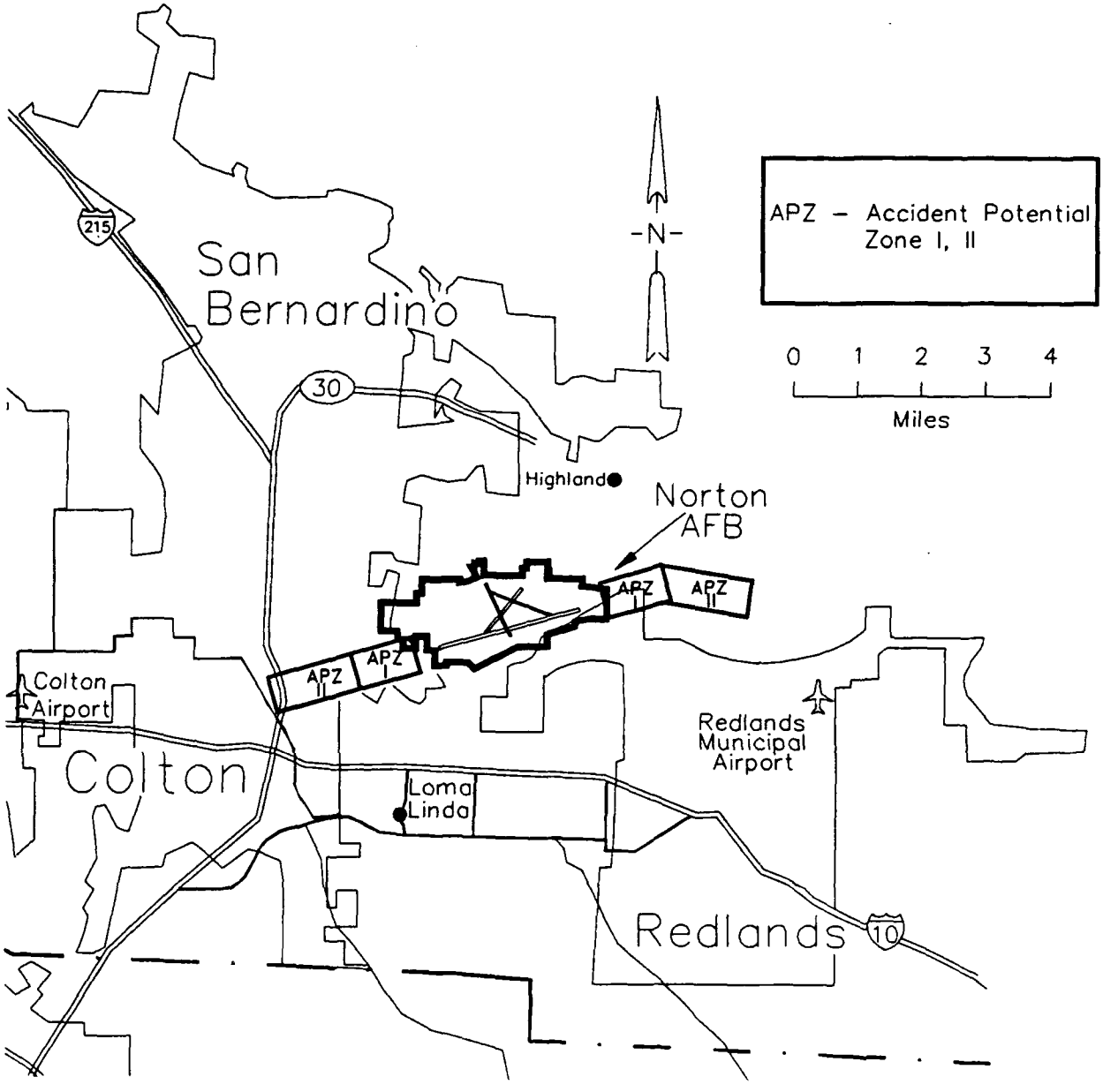


FIGURE 3.13 Accident Potential Zones near Norton AFB (Source: Adapted from Norton AFB 1988c)

TABLE 3.9 Summary of Accident Potential Zone Land Use Compatibility Guidelines[a]

Land Use Category	Compatibility of Use Category with APZ		
	Clear Zone	Zone I	Zone II
Residential	I	I	I
Industrial/manufacturing	I	I[b]	C[b]
Transportation, communication, and utilities	I	C[c]	C
Commercial retail trade	I	I[b]	C[b]
Services	I	I[b]	C[b]
Cultural, entertainment, and recreation	I	I[b]	I[b]
Resource production and extraction	I	C	C

[a]Meanings of alphanumeric entries are as listed below. Compatibilities listed are general; within a category, they may vary.

I - Incompatible: the land use and related structures should be prohibited.
C - Compatible: the land use and related structures are compatible without restriction.

[b]Compatibility can be affected by variations in population and structure density for this land use category.

[c]Passenger terminals and major aboveground transmission lines are prohibited.

Source: Norton AFB (1988c).

remain undeveloped (Fig. 3.12). (The three clear zone parcels outside the Norton AFB boundaries are covered by perpetual cut-to-ground easements, which are owned by the Air Force.) The Air Force recommends that residential development not occur in either APZ I or II (Fig. 3.13). The recommendations, however, suggest that development of other activities in APZ I and II may occur on a selected basis depending primarily on densities of structures and people. The development in the vicinity of Norton AFB includes some deviations from the APZ recommendations.

The Air Force has established criteria on height limitations of structures in areas surrounding the runway at Norton AFB. Figure 3.14 illustrates the region, extending up to 9.5 mi (50,000 ft) from the ends of the runway and 8.4 mi (44,500 ft) laterally, in which the height of structures is limited to 500 ft or less to avoid obstructing incoming or departing aircraft. Details of the specific height limitations in this area are given in Fig. 3.15.

3.4.3.2 Bird Aircraft Strike Hazard (BASH)

There is a wide variety of bird species in the vicinity of Norton AFB; however, there have been few bird strikes. One area of concern is a municipal landfill located less than one-half mile from the Norton AFB runway; the landfill is the most significant attractant in the area. There has been some increase in bird activity near Norton AFB. Whether the population increase is due to changes in the landfill operation, local land uses, weather patterns, or a combination of factors is unknown. Norton AFB has developed a BASH plan to promote safe flying operations in spite of bird problems that may develop. This plan:

- Establishes a Bird Hazard Working Group,
- Determines operating procedures to avoid high-hazard situations,
- Provides for dissemination of information to all assigned and transient aircrews on procedures for bird avoidance, and
- Decreases the attractiveness of the airfield to birds by eliminating, controlling, or reducing environmental factors that support the birds.

Norton AFB is also investigating different types of bioacoustics and pyrotechnics to stock should a bird problem develop and harassment be the most appropriate control method.

3.4.4 Hazardous Materials

3.4.4.1 Management of Hazardous Materials and Hazardous Waste

As part of its various current activities, Norton AFB generates materials that have been designated as hazardous wastes under RCRA (as outlined in 40 CFR Parts 261-265) and the state code (22 CAC 4, Chapter 30). Currently, the state of California has been authorized by EPA to implement the federal program as modified by its own regulations, which are more stringent than the federal requirements. These regulations require that the hazardous wastes be handled, stored, transported, disposed of, or

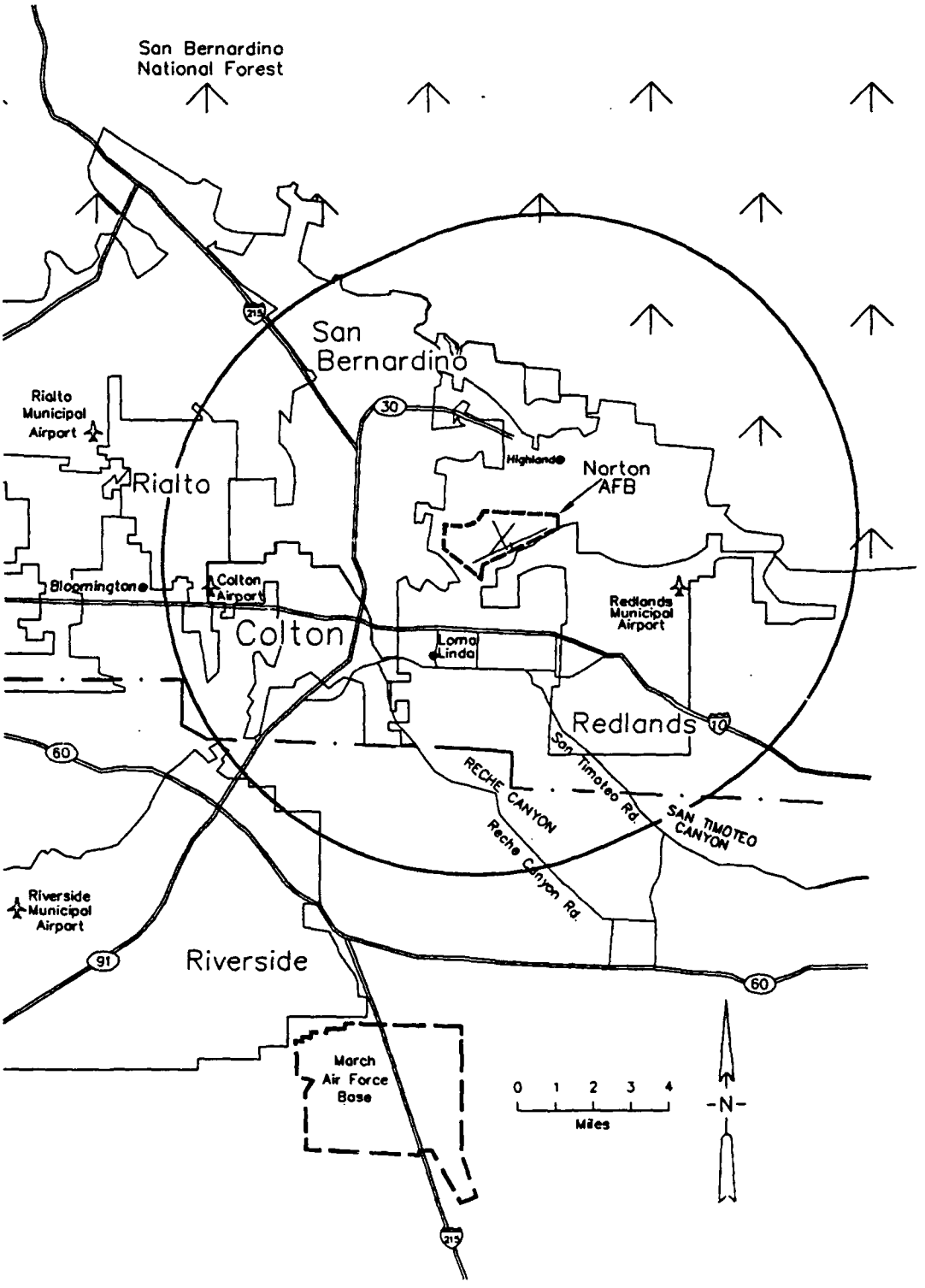
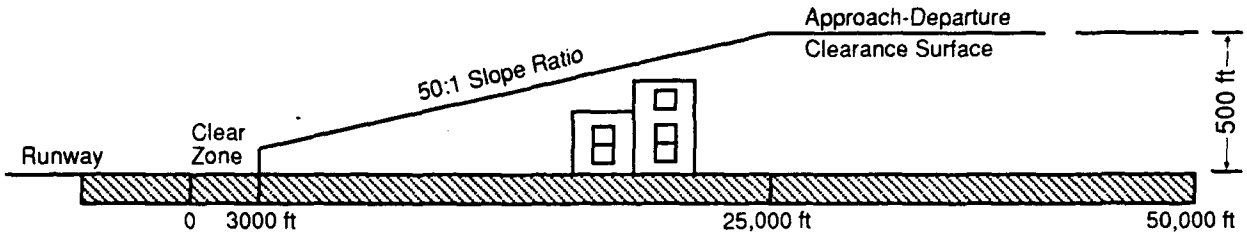
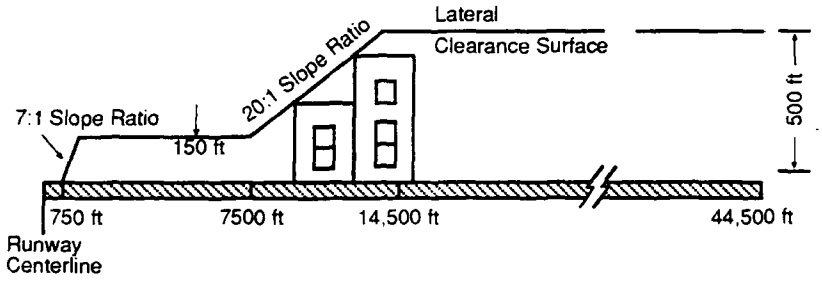


FIGURE 3.14 Regions near Norton AFB with Limits on Structure Height (≤500 ft above runway elevation) (Source: Adapted from Norton AFB 1988c)



(a) along extensions of the runway (the clearance surface is 200 ft wide at the runway end and expands uniformly to 16,000 ft wide at 50,000 ft)



(b) laterally from the sides of the runway

FIGURE 3.15 Limitations on Structure Height near the Norton AFB Runway (buildings depicted are hypothetical) (Source: Adapted from Norton AFB 1988c)

recycled according to defined procedures. Norton AFB has incorporated these procedures in a Hazardous Waste Management Plan, which is applicable to all activities.

The estimated annual quantity of these hazardous wastes generated and requiring disposal is about 21,000 gal/year, plus an additional 25,000 gal/year used petroleum products (not including quantities that are recycled or processed through the IWTP). Used petroleum products are regulated by California as hazardous wastes but are regulated by name under RCRA. Tables 3.10 and 3.11 provide estimated quantities of hazardous wastes currently generated by units moving from the base. Table 3.12 lists the sites on base where the on-hand amounts of usable (nonwaste) hazardous materials or oil products equal or exceed reportable spill quantities, and Fig. 3.16 shows their location on the base. Table 3.13 lists the hazardous waste accumulation points.

The waste collection at designated accumulation points is primarily in labeled 55-gal drums. Some hazardous wastes are also collected on the flight line using mobile bowsers* that have been labeled for the collection of various specific types of wastes. Additionally, some wastes are disposed of and treated through the base IWTP.

*Trailer-mounted tank, typically having a 750-gal capacity.

TABLE 3.10 Estimated Hazardous Waste Generation at Norton AFB, by Units that Would Relocate (gal/mo)

Generator	Paint Waste	Solvent[b]	Process Chem.	Alcohol	Vehicle Antifreeze	Process Oil	Batt. Acid	Used Petroleum Products[a] Fuel	Oil	Solvent[b]
63rd Military Airlift Wing Operations	0.2	0.1		5.0						
63rd Avionics Maint. Squad.	1.0	71.8		0.9			125.0		4.0	3.0
63rd Field Maint. Squad.	477.1	719.6	70.0	0.8	45.8	36.7		33.0	1,084.0	533.0
63rd Org. Maint. Squad.	5.0	44.4								
63rd Supply Squad.		2.6		1.3						
63rd Transportation Squad.	12.5	9.2								
63rd Aerial Port Squad.	0.7	22.9			4.2					
63rd Air Base Group Administration		25.0	7.5							250.0
63rd Civil Eng. Squad.	17.0	9.3		0.1					9.0	42.0
63rd Security Police Squad.		1.0								
1965th Communications Squad.	1.0	4.9			13.8				37.0	
AAF Exchange Service					8.4				101.0	

[a]Does not include estimated quantities of hazardous waste processed through the base's IWTP: 3,250 gal/mo fuel, 311 gal/mo oil, and 400 gal/mo solvent.

[b]Solvents are estimated under Used Petroleum Products and separately in the source. The extent of overlap in these entries has not been determined.

Source: 63rd ABG (1989).

TABLE 3.11 Summary of Estimated Hazardous Waste Generation by Norton AFB Units that Would Relocate

Hazardous Waste	Quantity Generated (gal)		
	Monthly	Quarterly	Annually
Paint waste	515	1,545	6,180
Solvent	911	2,733	10,932
Process chemicals	78	234	936
Alcohol	8	24	96
Vehicle antifreeze	72	216	864
Process oil	37	111	444
Battery acid	125	375	1,500
Used petroleum products[a]			
Fuel	33	99	396
Oil	1,235	3,705	14,820
Solvent	828	2,484	9,936

[a]Excludes waste processed through the IWTP.

Source: 63rd ABG (1989).

Generators of hazardous waste at Norton AFB are required to provide a complete breakdown of the contents of the hazardous waste submitted for recycling or disposal. If the waste composition is unknown, sampling and analysis is conducted by the base Bioenvironmental Engineering Services to establish the composition.

Jet fuel (JP-4) that has been contaminated is also treated as hazardous waste. "Contaminated" fuel is usually contaminated with water or some other substance that makes it unsafe for use as jet fuel but is not highly toxic. However, an attempt is made to recycle JP-4 fuel waste on base as fuel for aircraft or aerospace ground equipment (AGE) or in fire training, depending on the contaminant level.

The Norton AFB pest management program is conducted in accordance with DOD guidelines. The MAC Entomologist provides professional oversight for the Norton AFB program through biennial on-site pest management reviews, annual approvals of base pesticide products listed in the Pest Management Plan, and quarterly reviews of actual pesticide use. The base pest management program is conducted under the day-to-day supervision of DOD-certified pesticide applicators. There is no known history of pesticide environmental contamination on Norton AFB. Finished pesticide spray materials are either used up in process or are used to supplement diluent for additional spray applications. Pesticides do not generally contribute to Norton AFB's hazardous waste generation. Appendix A contains a list of herbicides and other pesticides that are currently used at Norton AFB as part of support operations for units to be withdrawn.

TABLE 3.12 Facilities at Norton AFB with Stored Hazardous Substances[a]

Facility	Hazardous Substance Stored[b]
233	Contaminated JP-4[c]
245	Photoprocessing chemical wastes (including sodium thiosulfate)
248	Persulfate and thiosulfate photoprocessing chemicals
249	Waste oil
258	Segregated oxidizers and flammables
302	Waste fuel (mostly JP-4)
331	Waste motor oil
414	Rodenticide, insecticide, and herbicide (dry and liquid)
427	Muriatic acid (stored in 1-gal plastic containers)
514	Various substances
524	Ammonium hydroxide (in camera room), photochemical bleach, fixer and neutralizer (in Art Services)
548	Various substances
675	Engine oil, lube oil, antifreeze, paint, thinner, solver., waste fuel
705	Lube oil, hydraulic fluid, motor gasoline
726	JP-4
763	Thinner, lube oil, trichloroethane, dry cadmium, waste paint
823	JP-4
924	Triethyl borane (a pyrophoric liquid)
938	Denatured alcohol, acetone, paint, gasoline, lithium batteries
939	Lubricant, hydraulic fluid, thinner, cleaning compound
964	Various chemicals and compounds
970	Polychlorinated biphenyls
1264	Oil sludge, various chemicals
2203	JP-4

[a]Table includes those sites with a potential for spills of reportable quantities, as defined by 40 CFR Parts 110, 112, and 117; CERCLA; and applicable state regulations.

[b]Oil is listed as a hazardous substance because California regulations define it as such.

[c]JP-4 is a jet engine test fuel composed of about 35% light petroleum distillates and 65% gasoline distillates.

Source: 63rd ABG (1986).

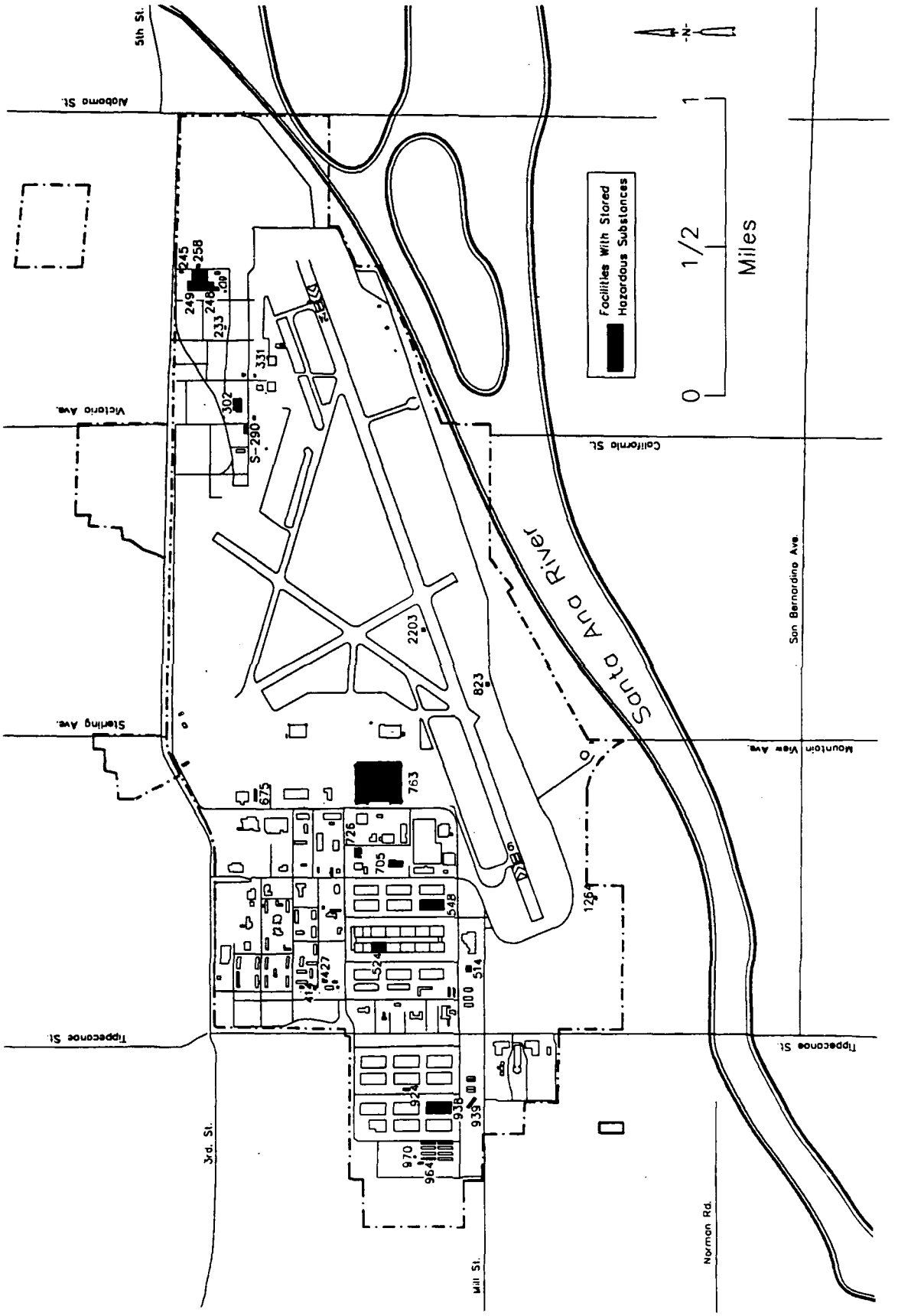


FIGURE 3.16 Locations of Stored Hazardous Substances at Norton AFB (Source: Locations from 63rd FMS 1989)

TABLE 3.13 Hazardous Waste Accumulation Points at Norton AFB

Facility	Location in Facility
341	Outside (NW, fenced area)
675	Inside at northwest corner
726	Outside at south side
763	Plating shop
763	Pneudraulics shop
763	Nondestructive inspection shop
763	Outside at southwest corner
763	Outside at southeast corner
Other	Northwest corner of flightline, next to aircraft parking area D-7

Source: 63rd FMS (1989).

Wastes handled through the IWTP include liquid wastes resulting primarily from aircraft washdown. These wastes, estimated at 66,000 gal/day, are transported to the IWTP primarily through a separate collection system. Additional wastes from maintenance, electroplating, and painting are also treated. These wastes are transported to the IWTP primarily in 55-gal drums by truck.

Until recently, the water effluent from the IWTP was discharged to the Santa Ana River under an NPDES permit (No. CA0002062) issued by the California Regional Water Quality Control Board, Santa Ana Region. The IWTP now discharges to a percolation pond inside the base near the IWTP, and an application has been submitted for a Facility Permit/Waste Discharge to replace the NPDES permit.

Most hazardous wastes collected at accumulation points are turned in to the Defense Logistic Agency's Defense Reutilization and Marketing Office (DRMO) facilities located at Norton AFB (Buildings 964 and 970). A disposal turn-in document must be prepared for all materials when they are transferred to DRMO.

DRMO has the responsibility to dispose of the received hazardous waste according to the regulatory guidelines. DRMO has an interim (Part A) permit for storage of the hazardous waste. Some hazardous waste is disposed of by Norton AFB directly through contract with approved disposal firms. Transferring the hazardous waste responsibility to off-site disposal contractors, either by the DRMO or Norton AFB, includes the preparation of manifests, copies of which must be signed and returned to the point of origin after the waste is disposed of or recycled.

According to the management plan, each organization generating or storing hazardous waste is required to ensure that all personnel who manage or handle wastes receive annual training with regard to safe procedures for carrying out their responsibilities.

Norton AFB has developed and implemented a Spill Prevention Response Plan that fulfills the requirements for a Spill Prevention, Control, and Countermeasures (SPCC) plan and an Oil and Hazardous Substance Pollution Contingency (OHSPC) plan. The plan identifies procedures to be followed, equipment to be readily available, persons responsible, material data safety sheets, and other information for preventing or containing spills of hazardous material.

3.4.4.2 Polychlorinated Biphenyls (PCBs)

Due to their low flammability and high heat capacity, PCBs have been used extensively as coolants and insulators in transformers and capacitors. Currently, 133 PCB transformers (defined as containing 500 ppm PCB or greater) and PCB-contaminated transformers (50-499 ppm PCBs) are in use at various sites at Norton AFB. In accordance with EPA regulations (40 CFR Part 761), the following actions have been taken with regard to PCBs at Norton AFB:

- All PCB liquids and PCB-contaminated items (50 ppm or greater PCBs) and out-of-service PCB capacitors that can no longer be used have been removed and disposed of according to EPA regulations.
- All in-service PCB transformers, large high-voltage PCB capacitors (greater than 3 lb PCBs), and new (since Jan. 1, 1979) small PCB capacitors have been labeled according to EPA regulations.
- All leaking PCB transformers and capacitors have been removed, and areas contaminated by leaks have been cleaned up.
- In-service PCB and PCB-contaminated transformers are inspected every three months, or every month if the transformer is in a high-risk area.
- An annual report on PCB dispositions is prepared and maintained by the base environmental coordinator.

Air Force policy is that Norton AFB will be PCB-free by the end of FY91.

3.4.4.3 Asbestos

During World War II, extensive use was made of asbestos in the construction of buildings at Norton AFB. Friable asbestos was used to insulate steam pipes, and nonfriable asbestos can be found in floor tiles, ceilings, and outside shingles. No comprehensive survey has been conducted, however, of the extent of asbestos occurring in the site buildings. The Air Force is requiring closure bases to complete nondestructive surveys by June 30, 1990.

3.4.4.4 Nonhazardous Refuse

Nonhazardous domestic and industrial refuse generation at Norton AFB is estimated at 2,060 tons/year. A local disposal company collects the refuse for disposal in an off-base sanitary landfill.

3.4.5 Socioeconomics

3.4.5.1 Employment and Economic Activity

Since Norton AFB is geographically located near the border between San Bernardino and Riverside counties, it is necessary to consider both counties in the following assessment. Many Norton AFB employees live in Riverside County, and much of the economic activity associated with Norton AFB "leaks" into Riverside. In addition, many Norton AFB employees living in San Bernardino County will probably not change residences once they start reporting to March AFB in Riverside County. Thus, the following economic baseline analysis examines San Bernardino County alone and both counties combined.

The total population in the two-county study area was reported as over 2 million people at the beginning of 1987: 1,139,100 in San Bernardino and 862,000 in Riverside. According to the U.S. Department of Commerce (DOC 1988), the study area contains about 725,000 households and the average per capita income is $12,141.

Data on the growth rates for the major economic sectors in San Bernardino County and the combined counties of San Bernardino and Riverside indicate that construction, manufacturing, and financial services have had the most steady growth in these counties during the period 1983-1987 (DOC 1989). The only sectors showing continuous decreases in activity are mining and farm production. The federal military jobs sector has experienced a very small amount of growth in recent years, both in San Bernardino County and the two-county area.

3.4.5.2 Public Utilities

The base and the housing surrounding the base receive electric service from Southern California Edison Company, a large integrated electric system serving the southern California area. According to the U.S. Department of Energy (DOE 1987), total sales to final customers in 1987 amounted to 63,494,291 MWh, with a total disposition of about 74,142,513 MWh. In 1987, Norton AFB used about 74,129.4 MWh, and the on-base housing consumed 2,606.3 MWh.

Natural gas is sold to the base by Southern California Gas Company. The total output for this company in 1987 was about 1,071.8 trillion Btu (Browns Directory 1988). Annually, the base uses 267,854 million Btu and the on-base housing accounts for 185,528 million Btu.

The Norton AFB sanitary sewer discharges into the San Bernardino Water Reclamation Department system for treatment. The Norton AFB discharge permit allows 1.0 million gal/day; the actual discharge as metered is 0.85-1.0 million gal/day (Watson 1989).

3.4.5.3 Transportation

In southern California, surface travel is mostly by highway; there is no commuter rail system. The main highways serving Norton and March AFBs are Interstates 10, 15, and 215 and State Routes 30, 60, and 91 (see Fig. 1.2). Various segments of the roads in Riverside and San Bernardino counties are characterized by traffic volumes that exceed the design volume. Tables 3.14 and 3.15 list road segments on which the volume-to-capacity (V/C) ratio exceeded 1.0 during 1984.

As a basis for evaluating the contribution to area traffic volumes of Norton AFB employees commuting to the base, the residential locational distribution of Norton AFB employees and a density map of the residential distribution are shown in Figs. 3.17 and 3.18, respectively. These data show that more than two-thirds of the base's employees live in the San Bernardino, Redlands, or Highland areas or on base.

A recent survey by Commuter Transportation Services (CTS 1989) found that more than 75% of the employees of Norton AFB live within 10 mi of the base (Fig. 3.19) and that the average commuting time for about 80% of the employees is 20 min or less (Fig. 3.20). This study also indicated that 82% prefer to drive alone. Only 9% of the employees choose to car pool, and a negligible portion of the employees commute by public transportation or other modes. The incentives offered to encourage ride-sharing are few and relatively conservative. Based on the South Coast Air Quality Management District calculation, the average vehicle ridership (AVR) of Norton employees is 1.06.

Table 3.16 provides estimates of the number of daily commuter vehicle trips to Norton AFB (No. of employees living in the area/AVR) from eight locations in the study area. On weekdays, more than 65% of the employees arrive at the base during the peak hour (7:00-8:00 a.m.).

The total number of trucks, flatbeds, and tractor/trailer vehicles that travel to Norton AFB is about 250 vehicles per day; these are assumed to travel to Norton AFB from outside the 10-mi radius discussed above.

3.4.5.4 Recreational and Support Resources

The armed forces have always had a commitment to developing recreational and support facilities on their bases; Norton AFB is no exception. Table 3.17 lists the recreational facilities found on base. On-site support services include a library branch, financial management branch, barber shop, catering service, ticket and tour office, art/crafts sales shop, thrift shop, golf course, and child development center.

Existing recreational facilities that can be found outside the base include a state urban recreational area, community parks, public golf courses and swimming pools, and museums.

TABLE 3.14 Study-Area Highway Facilities Congested with a V/C Ratio between 1.0 and 1.25

Facility	Congested Segment
Riverside County	
Arlington Avenue	Magnolia Avenue to Victoria Avenue
California Avenue	North Arlington to 6th Street
Indiana Avenue	Washington Street to Jefferson Avenue
I-215/Rte. 60 Freeways	Route 91 Freeway to Chicago Avenue
Milliken/Hamner Ave.	Bellegrave Avenue to Schleisman Road
Orange Street	14th Street to University Avenue
Route 91 Freeway	Route 71 Expressway to W. 6th Street
Route 91 Freeway	Hamner Avenue to I-15 Freeway
Tyler Street	Well Avenue to Hole Avenue
Van Buren Boulevard	Central Avenue to Arlington Avenue
San Bernardino County	
Euclid Avenue	Riverside Drive to Edison Avenue
Foothill Boulevard	Vineyard Avenue to Archibald Avenue
Grove Avenue	Foothill Boulevard to Arrow Route
Grove Avenue	Francis Street to Philadelphia Street
Highland Avenue	State Street to Muscott Street
Highland Avenue	Golden Avenue to Del Rosa Avenue
I-215 Freeway	Orange Show Road to Washington Street
Mill Street	Vernon Avenue to I-215 Freeway
Mill Street	E. Street to Tippecanoe Avenue
Milliken Avenue	Jurupa Street to Van Buren Boulevard
Mountain Avenue	19th Street to Baseline Avenue
Mountain Avenue	Foothill Boulevard to 4th Street
Sierra Avenue	I-10 Freeway to Slover Avenue
Vineyard Avenue	4th Street to I-10 Freeway

Source: SCAG (1987).

3.4.5.5 Military and Civilian Retirees

About 10,074 military retirees live within 50 mi of Norton AFB. These are retirees from the Army, Navy, Marines, National Guard, Reserves, and Air Force who rely on the base for health, financial, shopping, and recreational services. In addition to the recreational facilities discussed above, retired military personnel use the following facilities at Norton AFB:

- USAF Clinic Norton, in particular for outpatient medical, dental, and pharmaceutical services;

TABLE 3.15 Study-Area Highway Facilities Congested with a V/C Ratio of 1.25 or Greater

Facility	Congested Segment
Riverside County	
Alessandro Boulevard	Trautwein Road to Frederick Street
Etiwanda Avenue	Route 60 Freeway to Route 91 Freeway
Hamner Avenue	Schleisman Road to 6th Street
Railroad Street	Smith Avenue to W. Grand Boulevard
Route 71 Expressway	Euclid Avenue to Route 91 Freeway
Van Buren Boulevard	Limonite Avenue to Central Avenue
Victoria Avenue	14th Street to University Avenue
Watkins Drive	I-215 Freeway to Nisbet Way
San Bernardino County	
Central Avenue	Kingsley Avenue to Holt Avenue
Central Avenue	Route 60 Freeway to Walnut Avenue
Church Street	Baseline Street to Railroad Street
Grove Avenue	6th Street to Holt Boulevard
Highland Avenue	E Street to Golden Avenue
Milliken Avenue	Airport Drive to Jurupa Street
Sultana Avenue	6th Street to 4th Street
Vineyard Avenue	I-10 Freeway to D Street

Source: SCAG (1987).

- Credit Union,
- Base Exchange, and
- Commissary.

Civilian retirees have the option to use morale, welfare, and recreation facilities and the Credit Union.

3.4.5.6 Land Use

The land surrounding Norton AFB is oned for a variety of residential, commercial, and industrial uses (Environmental Public Works Agency 1989). The residential areas primarily consist of single-family detached dwellings in subdivisions with schools, while commercial uses are made up mostly of governmental, business, or professional buildings; medical offices or clinics; hotels; and supermarkets. Industrial

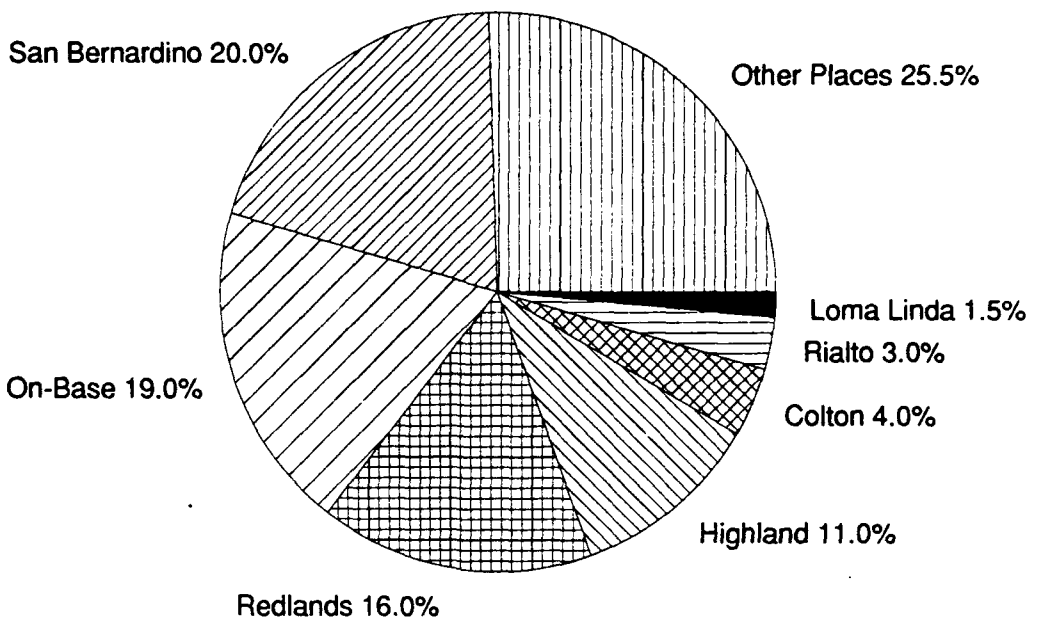


FIGURE 3.17 Distribution of Norton AFB Employee Residences, by Community (Source: Adapted from CTS 1989)

uses in the area consist of storage yards, industrial plants, and motor and rail terminals. The principal communities that surround the base are Highland, Loma Linda, Redlands, and San Bernardino.

In areas to the northeast and southwest of Norton AFB, along the take-off and landing flight tracks, some residential and commercial development is incompatible with AICUZ recommendations (see Sections 3.4.2 and 3.4.3).

The Santa Ana River forms the south and southeast perimeter of the base. Otherwise, the base is completely surrounded by residential communities. Several small ponds occur on the site, specifically within the golf course and adjacent to the Santa Ana River. These ponds are man-made.

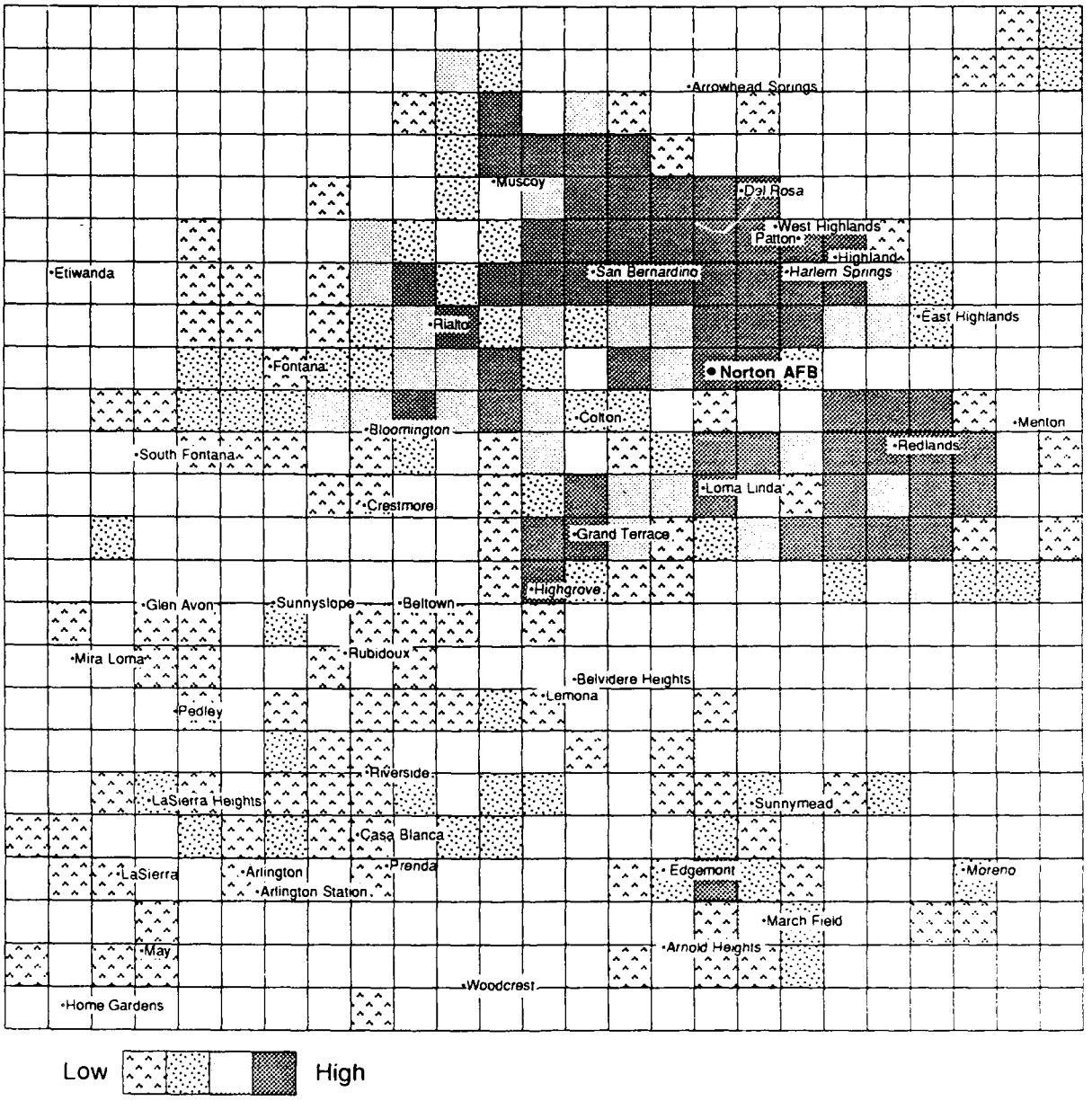


FIGURE 3.18 Density Map for Norton AFB Employee Residences (Source: Adapted from CTS 1989)

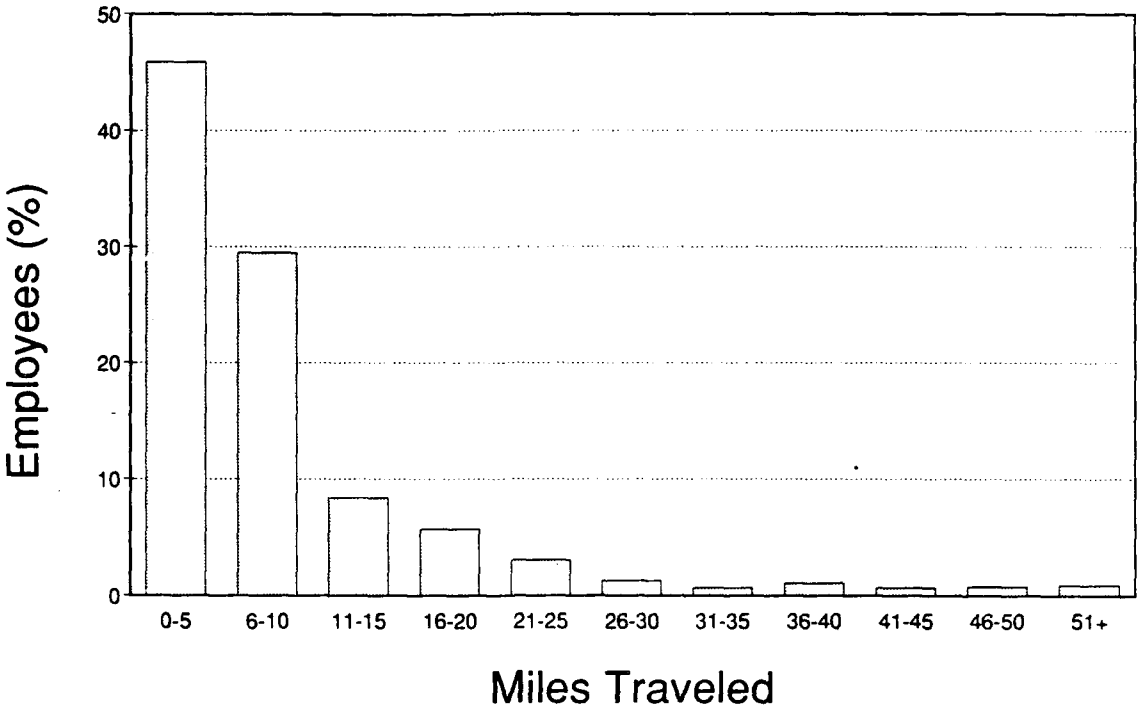


FIGURE 3.19 Commuting Distance for Norton AFB Employees (Source: Adapted from CTS 1989)

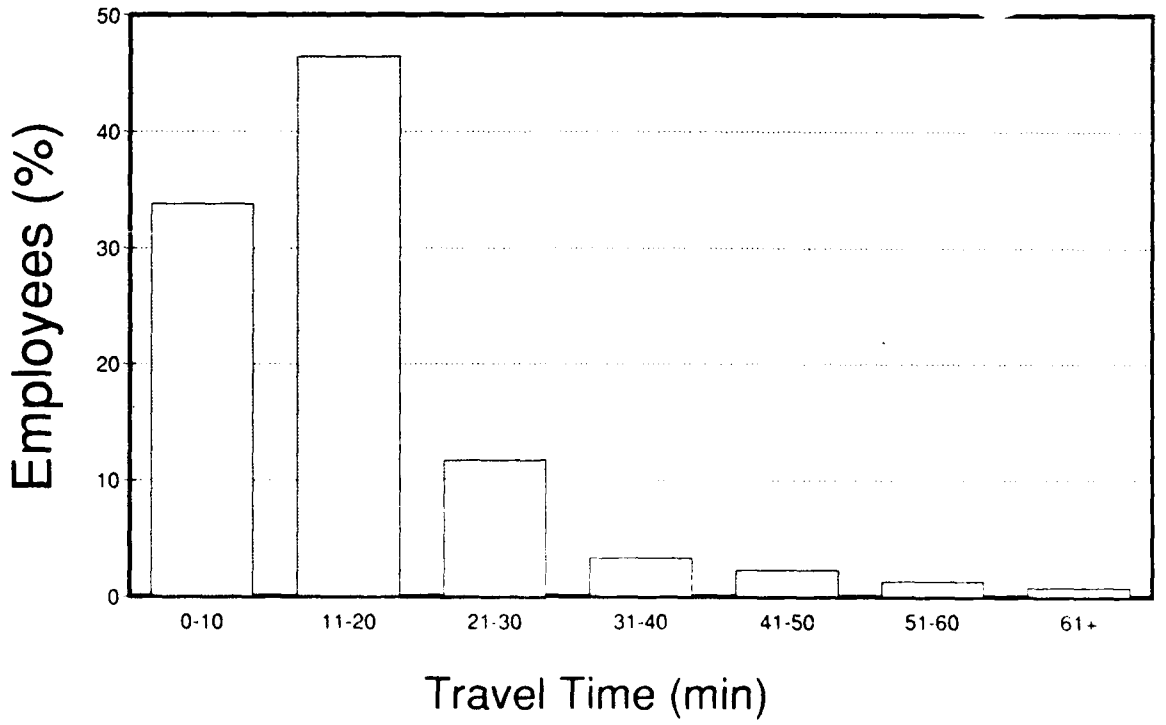


FIGURE 3.20 Average Commuting Time for Norton AFB Employees (Source: Adapted from CTS 1989)

TABLE 3.16 Estimated Daily Commuter Trips to Norton AFB from Regional Locations

Location	% of Employees	No. of Employees	No. of Trips
On base	19	1,202	1,133
San Bernardino	20	1,265	1,193
Redlands	16	1,012	954
Highland	11	695	655
Colton	4	253	238
Rialto	3	190	179
Loma Linda	1.5	100	94
Other	25.5	1,612	1,520

Source: CTS (1989).

TABLE 3.17 Recreational Facilities Located on Norton AFB

Recreational Facility	Building or Area
Picture Framing	302
Auto Hobby Shop	302
Bowling Center	190
Ceramics Craft Shop	302
Galaxy Swimming Pool	178
Recreation Center	24
Palm Meadow Golf Course	818
Golf Pro Shop	818
Starlifter Swimming Pool	142
Wood Craft Shop	302
Youth Center - Teen Club	615
Sports and Fitness Center	182
Child Development Center	24
Library	125
Equipment Rental	655
NCO Club	48
Officers Club w/Pool	S-7
Golf Snack Bar and Lounge	817
Picnic Area and Playground	2
Softball Fields (four)	
Tennis Courts (ten)	
1/4-Mile Jogging Track	

Source: Norton AFB staff.

4 ENVIRONMENTAL CONSEQUENCES

This section discusses the impacts of the base closure on the existing environment described in the previous section, including the physical, biological, and human environments. Because the Base Realignment and Closure Act requires implementation of the closure/realignment, "no action" is not an alternative. However, Chapter 3 presents the environmental conditions associated with Norton AFB and its operations. For the purposes of this analysis, these conditions represent the baseline against which the implementation impacts were judged.

4.1 PHYSICAL ENVIRONMENT

4.1.1 Earth Resources

4.1.1.1 Installation Restoration Program

As part of the DOD IRP, 22 sites at Norton AFB have been identified and evaluated as possibly requiring restoration due to contamination from previous activities (see Section 3.2.1.2). Although restoration of these sites is a necessary consideration before the sites can be offered for reuse, the activities related to the withdrawal of units from the base will not directly affect the IRP sites. Activities that could further contaminate these sites have already been discontinued.

The Air Force has committed to completing the restoration of contaminated sites at Norton AFB through the process of an Interagency Agreement (IAG), which was signed June 29, 1989, by the Air Force, the California Department of Health Services, and EPA Region IX. The Air Force commitment to this agreement is independent of the future status of Norton AFB; thus, the timely implementation of its features should not be affected by the withdrawal process.

Potential indirect impacts on the IRP of the withdrawal that have been considered in this assessment are the possibilities that the realignment of Air Force manpower will (1) lead to increased exposure to the contaminated sites or (2) adversely affect active containment of the contamination.

Endangerment assessments conducted for the IRP sites indicated health risks from groundwater contamination if the contaminated groundwater were to be used for drinking water, or if the contamination plume reached existing drinking wells in the area. A reduction in the number of persons using the groundwater as a source of drinking water thus is a possible positive impact from the withdrawal of units from Norton AFB.

A further possible impact from the withdrawal is possible changes in groundwater flow patterns associated with reduced groundwater withdrawal. Current groundwater use by the base units and housing is 190 million gal/year, including 50 million gal/year purchased from municipal water supplies for use by base housing; groundwater use by

base housing is projected to continue. Insufficient data were available for this analysis to determine the effect of this change in withdrawal on movement of the contamination plume. It is thus not known if the impact, if any, is positive or negative (see the discussion of mitigative measures below).

The IRP endangerment assessment also indicated health risk from direct contact with the contaminated soil. Withdrawal of units will reduce the number of persons that could potentially come into direct contact with these soils, and will thus have a positive impact on the related health risk levels.

The following measures will ensure that the withdrawal action does not negatively affect the IRP:

- Continue monitoring the contamination plumes to provide early warning of significant changes during the period between withdrawal and cleanup for reuse. This will include at least quarterly monitoring of area water wells. If contaminant levels are observed to change, consideration will be given to modeling groundwater contaminant transport to determine groundwater pumping or some other strategy, as an interim measure, to retard plume spread.

- Continue current base security functions to prevent unauthorized entry into IRP site areas that could lead to direct contact with contaminated soils or groundwater.

Implementation of these measures will require that persons responsible for monitoring and site security be retained on base, or that these responsibilities be formally transferred to others that will remain at the base.

4.1.1.2 Underground Storage Tanks

Underground storage tanks that become inactive as the result of withdrawal of units from Norton AFB present the possibility for leaks to the soil and groundwater if adequate precautions are not implemented. New federal UST regulations, which became effective in December 1988, are designed to minimize this possibility. These regulations require the following actions to be taken with tanks that are no longer used:

- Tanks that are not used can be "temporarily" closed for 3-12 months. During the temporary closure, any leak detection or corrosion protection devices must be kept operational. (If the tank is empty, leak detection is not necessary.)

- All lines connecting to the UST, except the vent line, must be capped during temporary closure.

- Tanks that are not protected from corrosion must be permanently closed after 12 months using the following procedures:
  - Notify the regulatory authority 30 days before closure.
  - Determine if leaks have occurred and if so initiate appropriate cleanup procedures.
  - Remove all liquids, dangerous vapors, and accumulated sludge.
  - Either remove the UST or fill it with a chemically inactive solid, such as sand.
- Tanks that have corrosion protection and meet other standards for upgraded USTs can remain "temporarily" closed indefinitely.
- The regulatory authority can grant an extension beyond the 12-month limit on temporary closure for USTs unprotected from corrosion.
- The UST need not be permanently closed if it is filled with an unregulated substance (e.g., water) after it is emptied, cleaned, and checked for previous leaks.

These federal regulations, and other county regulations, will be followed to minimize any negative impacts of UST inactivity related to unit withdrawal from Norton AFB.

4.1.2 Air Resources

4.1.2.1 Technical Approach and Methods

The withdrawal of units from Norton AFB will result in a reduction in emissions of air pollutants from the base and its vicinity. The emission reduction is a net result of the following decreases and increases:

1. Emissions to be eliminated:
   a. All aircraft-related emissions;
   b. All boiler and furnace emissions except for those associated with the units remaining at Norton AFB;
   c. Other stationary source emissions except for the ROG emissions from the AAVS units; and

d. Vehicular emissions associated with vehicles assigned to the base, military and civilian employee commuting (i.e., those assigned to March AFB and elsewhere), military retiree visits to Norton AFB facilities, and truck traffic associated with base operation.

2. Emissions to be created: Vehicular emissions associated with commuting by employees transferred to March AFB (assumed to remain in the vicinity of Norton AFB) and travel by retirees to use the various facilities at March AFB.

Vehicular emissions associated with the contract civilians and other industries providing services to Norton AFB are assumed to remain in the area without any substantial change. Vehicular emissions associated with Reservists (2,800 of the 3,261 Reservists currently assigned to Norton AFB will be reassigned to March AFB) are assumed not to change significantly after unit withdrawal. Vehicular emissions associated with military retiree visits to the base after unit withdrawal. Vehicular emissions that may be created after the Norton AFB closure due to additional travel to March AFB by military and civilian retirees are considered in the projections.

Emissions to be eliminated were identified from the original emissions calculations used to develop the current Norton AFB emissions inventory (Table 3.4). Emissions to be created were estimated using the same methodology for vehicular emission calculations and considering the increased distance from the Norton AFB area to March AFB. Air quality impacts in the vicinity of Norton AFB were assessed on the basis of the net emission changes resulting from the unit withdrawal as fractions of the total current emissions from Norton AFB and the SCAB portion of San Bernardino County. Air quality impacts along the highways leading to March AFB were evaluated on the basis of the estimated increases in vehicular traffic along these highways. Since these impacts are relatively minor, air quality modeling was not performed for the impact analysis.

4.1.2.2 Impact Analysis

The impacts of the action on ambient air quality are described for the following two periods: (1) during the unit withdrawal (1990-1995) and (2) after the withdrawal is completed.

Withdrawal Period. During the period of unit withdrawal (1990-1995), the stationary and mobile source emissions associated with units transferring to other bases will gradually be eliminated from the Norton AFB area. Thus, the ambient air quality will gradually improve in and around Norton AFB.

While emission levels from Norton AFB operational sources gradually decline, there will be a temporary increase in truck traffic for moving equipment and furniture from Norton AFB to March AFB and other bases. According to the traffic impact analysis data presented in Section 4.3.5.3, an average of about 7.5 heavy-duty trucks per

day will be operating for this purpose between Norton and March AFBs during this period. The air pollutant emissions associated with this truck traffic are listed in Table 4.1. Compared with current emissions from Norton AFB and San Bernardino County, these emissions are negligible. The temporary emissions in the vicinity of Norton AFB that may result from the truck traffic for moving equipment and furniture to bases other than March AFB would be substantially smaller than those associated with the move to March AFB.

The 1987 annual averages for daily traffic along I-215 and Route 60 between Norton and March AFBs were about 120,000 total vehicles and 8,400 trucks for I-215 and 77,000 total vehicles and 8,100 trucks for Route 60 (Calif. Department of Transportation 1988). Seven trucks per day amounts to less than 0.1% of the 1987 truck traffic along these highways. Thus, air quality impacts due to emissions from the additional truck traffic are estimated to be negligible. In addition, these impacts are temporary and will cease to exist after withdrawal is completed in 1995.

Post-Withdrawal Period. The air-pollutant emission changes in the Norton AFB area as a result of the unit withdrawal, as well as emissions remaining at Norton AFB afterward, are listed in Table 4.2. About 91-99% of Norton AFB's current emission sources will be eliminated. (Table 4.3 expresses the data as percentages of current emissions from Norton AFB and the SCAB portion of San Bernardino County.) The emission increases due to the commuting by employees transferred to March AFB and the travel by military retirees using facilities at March AFB are much smaller than the expected emission decreases resulting from unit withdrawal, resulting in a negative net

TABLE 4.1 Comparison of the Temporary Emission Increases during Unit Withdrawal and the Current Emissions from Norton AFB and San Bernardino County (tons/day)

Source	ROG	NO_x	CO	SO_2	TSP	PM_{10}	Pb[a]
San Bernardino Co., SCAB portion	108.0	85.1	409.0	5.8	141.5	70.9	b
Norton AFB							
Current total	4.78	1.56	8.00	0.16	0.25	0.21	0.68
Temporary increases during withdrawal	0.001	0.005	0.011	<0.001	0.001	0.001	0.006

[a]The unit for lead is lb/day.

[b]Not available.

TABLE 4.2 Expected Emission Changes at Norton AFB due to Unit Withdrawal (tons/day)

Source	ROG	NO_x	CO	SO_2	TSP	PM_{10}	Pb[a]
San Bernardino Co., SCAB portion	108.0	85.1	409.0	5.8	141.5	70.9	b
Norton AFB							
Current total	4.78	1.56	8.00	0.16	0.25	0.21	0.68
Withdrawal impact							
Decreases	-4.75	-1.49	-7.72	-0.16	-0.23	-0.20	-0.62
Increases	0.11	0.13	1.09	0.01	0.11	0.07	0.33
Net changes	-4.64	-1.36	-6.63	-0.15	-0.12	-0.13	-0.29
Remaining after unit withdrawal	0.03	0.07	0.28	0.002	0.017	0.012	0.05

[a]The unit for lead is lb/day.

[b]Not available.

TABLE 4.3 Comparison of Withdrawal-Related Emission Changes and Current Emissions (%)

Change	ROG	NO_x	CO	SO_2	TSP	PM_{10}	Pb
Emissions decrease							
As % of NAFB total	99.4	95.6	96.5	98.9	93.4	94.5	91.2
As % of San Ber. Co.[a]	4.4	1.8	1.9	2.8	0.16	0.28	b
Emissions increase							
As % of NAFB total	2.3	8.3	13.6	6.3	44.0	33.3	48.5
As % of San Ber. Co.[a]	0.10	0.15	0.27	0.17	0.08	0.10	b
Net emissions decrease							
As % of NAFB total	97.1	87.2	82.9	93.8	48.0	61.9	42.6
As % of San Ber. Co.[a]	4.3	1.6	1.6	2.6	0.08	0.18	b

[a]SCAB portion only of San Bernardino County.

[b]Not available.

change. Therefore, some improvements in the levels of primary air pollutants are expected in the immediate vicinity of Norton AFB. However, the net emission reductions are still a small fraction of the total emissions from the SCAB portion of San Bernardino County. Thus, these emission reductions would result in relatively small improvements in the ambient air quality of San Bernardino County.

The new emissions (i.e., emission increases) listed in Table 4.2 are due to vehicular traffic associated with the commuting by employees transferred to March AFB and the travel by retirees visiting the commissary at March AFB, and therefore would occur along highways between Norton AFB area and March AFB. Traffic analysis data (Section 4.3.5.3) indicate that the estimated peak-hour traffic increases due to this additional travel would amount to about 1-2% of the total traffic along these highways in 1988. Therefore, no significant impacts on ambient air quality are expected along these highways as a result of the action.

4.1.3 Water Resources

Withdrawal of units from Norton AFB will significantly reduce groundwater consumption by the base, which is currently estimated at 890 million gal/year, including consumption by base housing. This will be a positive impact, increasing the groundwater availability for other users (also see Section 4.1.1.1).

No negative impacts to surface water were identified.

4.2 BIOLOGICAL ENVIRONMENT

4.2.1 Vegetative and Wildlife Resources

Technical Approach and Methods. The common approach to assessing impacts to terrestrial resources is to (1) identify the plant and animal communities typically found at the site, (2) determine any unusual habitats or special habitat requirements for plants and animals, (3) overlay the known and potential impacts with what is known about the plant and animal communities, and (4) predict known and potential impacts to the vegetative and wildlife resources that may result from the action.

Impact Analysis. The vegetative resource on Norton AFB may be removed or altered because of the troop withdrawal. However, this impact is not expected to be large or significant. Most of the native plant community on the base is already altered and maintained as fields or lawns. The native plants that exist are primarily found along the Santa Ana River, and this area is not expected to be disturbed by unit withdrawal.

Animal species that are found on Norton AFB are mostly indigenous and common to the area. Wildlife species may become temporarily displaced because of the short-term increase in activity, noise, and vegetative disturbance that may result from troop

withdrawal. However, none of these potential impacts would be significant enough to threaten the existence of an entire species. The lack of concentrated use in certain areas during the time between the completion of unit withdrawal and reuse of the base may actually enhance the current use of the base by wildlife.

Cumulative Impacts. The action would result in no appreciable negative cumulative impacts to the vegetative or wildlife resources. Depending on the elapsed time between completion of the action and reuse of the base, a slight positive impact may occur for the terrestrial environment. Because the areas surrounding the base are heavily developed, allowing a large contiguous tract of land to remain with relatively less disturbance may be advantageous to the local wildlife.

Mitigative Measures. Because the action is not expected to adversely affect the local environment, no specific mitigative measures are planned.

4.2.2 Threatened and Endangered Species

Technical Approach and Methods. In assessing impacts to threatened and endangered species, several steps are needed to ensure compliance with the Endangered Species Act. The specific steps needed are (1) to inform the FWS, in writing, of the federal action under consideration, including a map of the project boundary, and to request from them a list of endangered, threatened, and candidate species for the area of concern; (2) upon receiving their response, to determine if the federal action requires a biological assessment, which is often the case in a construction project; and (3) if a biological assessment is not required, to review project activities to determine whether the listed species would be affected. The Air Force, as the lead agency for the action, has the primary responsibility for taking these steps.

Impact Analysis. Based on informal discussions to date between FWS and Air Force representatives, closure of the base is not expected to have adverse effects on any endangered species that may be on Norton AFB. Only the Santa Ana wooly-star is known to occur within the floodway of the Santa Ana River near Norton AFB. The other federally listed endangered species, slender-horned spineflower and least Bell's vireo, may also exist on the base in association with the Santa Ana River floodway. The survey to determine if protected species are present on Norton AFB will be conducted next spring/summer by the FWS; in the interim, there is no expectation of harm to protected species because closure should not alter or disturb the area associated with the Santa Ana floodway.

As for the four candidate species that may occur, the action is not expected to cause a significantly adverse impact. However, several of these species may experience being temporarily displaced because of the increase in activity, noise, and vegetative disturbance that may result from unit withdrawal. Nonetheless, these potential impacts

would not be significant enough to threaten the existence of the species. The lack of concentrated use in certain areas during the time between the completion of unit withdrawal and reuse of the base may actually enhance the current use of the base by these wildlife species.

Cumulative Impacts. The action would result in no appreciable negative cumulative impacts to federally listed endangered or candidate species. Depending on the elapsed time between completion of the action and reuse of the base, a slight positive impact may occur for these species. Because the areas surrounding the base are heavily developed, allowing a large contiguous tract of land to remain with relatively less disturbance may be advantageous to these endangered and candidate species.

Mitigative Measures. If the survey indicates the presence of threatened or endangered species, MAC will consult with the FWS Endangered Species office and request their recommendations for mitigative measures.

4.3 HUMAN ENVIRONMENT

4.3.1 Archaeological, Cultural, and Historic Resources

Closure of Norton AFB is not expected to have any adverse effect on archaeological sites or historical structures listed or eligible for inclusion in the *National Register of Historic Places.* Removal of military units from Norton AFB would entail negligible disturbance to the ground surface or subsurface. Maintenance of existing structures would continue (at a reduced level), as some units would remain on base. Withdrawal of the units does not include transfer of any base property to private ownership (which would remove historic properties from the protection of federal and state historic preservation laws). MAC personnel will seek SHPO concurrence with a "no effect" determination for the closure action.

The BSD is considering the option of using two existing warehouses for support facilities. If this is done, some minor modification of these facilities could occur. If the facilities selected are potentially significant historic properties, MAC will ensure that it complies with the National Historic Preservation Act.

4.3.2 Noise

Withdrawal of units from Norton AFB will have the positive impact of eliminating the noise levels associated with aircraft landings, departures, and ground activities (refer to Fig. 3.10 for current noise levels). Because reuse of the base as an airport is possible, noise levels due to aircraft operations could conceivably increase in the future.

Some temporary increase in noise level would be associated with the truck transportation used to move the units from the base. This truck traffic has been estimated at an average of 7.5 trucks per day during the move operations (Section 4.3.5.3). This would be offset by the decrease in current ground transportation in and surrounding the base, which includes an estimated average of 250 trucks entering and leaving the base each weekday.

4.3.3 Accident Potential Zones and Building Height Limitations

Cessation of flight operations at Norton could eliminate the zoning constraints due to accident potential and restrictions on building height in the vicinity of the runway (see Figs. 3.12 and 3.13). Reuse of the facility as an airport is a possibility, and any controls that have been implemented to prevent incompatible development should remain in effect until decisions on reuse have been made.

4.3.4 Hazardous Materials

4.3.4.1 Hazardous Waste Generation and Management

Impact Analysis. The proposed withdrawal of units from Norton AFB would reduce hazardous waste generation at the base by about 3,800 gal/mo. Of this amount, 1,746 gal/mo requires off-site disposal and the remainder is recycled or processed on site through the IWTP.

Reduction in the generation of hazardous waste is a positive impact. The risk of spills and possible site contamination related to the generation, storage, and handling is consequently reduced. The reduced generation also results in reduced risk related to transporting the wastes off site for treatment and disposal.

(For a number of the units being withdrawn, the action is not actually a cessation of generation, but rather a transfer of the generation to the relocation sites. Separate assessments are being conducted of the impacts at those relocation sites.)

There will be some negative impact on the handling of hazardous material and waste from the withdrawal process due to (1) the need to remove and transport or dispose of unused hazardous material stocks and (2) the process of cleaning, draining, and other preparations of equipment for transport that will generate additional waste, some of which will be hazardous. These operations will be carried out in compliance with applicable federal and state regulations.

The proposed withdrawal of units from Norton AFB will also have the positive impact of reducing the nonhazardous refuse generated at Norton AFB and disposed of in sanitary landfills. The current total refuse generation is estimated at 2,060 tons/year; however, this generation will not be eliminated completely due to retention of the family

housing and some tenants under the withdrawal plan. An additional positive impact is the reduction of herbicide and other pesticide application at Norton AFB.

Mitigative Measures. Any negative impacts related to ongoing generation of hazardous waste at Norton AFB (Section 3.4.4.1), or from the generation of new wastes and handling of unused hazardous material as part of the withdrawal process, will be minimized by ensuring that currently available guidelines continue to be followed. These guidelines, as described in the Hazardous Waste Management Plan for the base (63rd ABG 1989), include:

- Using approved containers with warning labels,
- Keeping hazardous waste containers in approved accumulation and storage locations,
- Segregating wastes,
- Providing a complete analysis of the contents of the waste,
- Completing manifests for the transfer of the material,
- Maintaining records,
- Training all persons involved in the handling of the wastes, and
- Maintaining spill response equipment and a plan for its use.

Hazardous waste accumulation and storage locations that are no longer used as the result of the withdrawal must be formally closed. The Hazardous Waste Management Plan (63rd ABG 1989) requires that all hazardous materials be removed, any remaining spill residues be cleaned up by trained personnel, and notification of closure be submitted to appropriate authorities.

Closure of the DRMO storage site will also include closing out the interim (Part A) permit for that site.

4.3.4.2 PCBs

The PCB and PCB-contaminated transformers in service at Norton AFB will not be directly affected by the withdrawal. To ensure that these remaining transformers do not leak and create site contamination, the procedure will be continued, as required by regulations, to inspect these transformers every three months, or every month if the transformer is in a high-risk area. Further, an annual report will continue to be prepared and maintained for PCB dispositions by the base Environmental Coordinator or appointed alternate. Air Force policy is that Norton AFB will be PCB-free by the end of FY91.

By October 1, 1990, the use of large (480 volts or greater secondary voltage) PCB transformers in or near commercial buildings at Norton AFB will be discontinued. These actions are in agreement with EPA regulatory requirements.

4.3.4.3 Asbestos

The asbestos used in the construction of the Norton AFB facilities will not be directly affected by the proposed withdrawal, but will likely be a factor during rehabilitation of buildings required for retention of the BSD and AAVS. Should removal of asbestos be involved, this will be handled by trained personnel using approved procedures.

Additional exposure due to unauthorized entry into the vacated buildings will be minimized by continuing Security Police checks.

4.3.5 Socioeconomics

An EIS is required to discuss socioeconomic effects only when such effects are interrelated with natural or physical effects. During preparation of this EIS, the Air Force considered whether there might be any indirect biophysical effects that could be attributed to socioeconomic impacts. No such effects or interrelationships were found. Therefore, it was not necessary for the completeness of the environmental analysis to forecast socioeconomic consequences, and this EIS does not attempt to do so.

However, the Air Force is sensitive to the community upheaval caused by closing a major employer like an Air Force base. Therefore, the Air Force is working with the Office of Economic Adjustment (OEA) to assist those communities expected to be hardest hit as a result of base closure.

Also, a second EIS will be prepared to assess the Air Force's proposed final disposition of the base property, including community reuse. A study that will be part of the second EIS will be conducted to examine the overall effects on socioeconomic factors. This study will include (for example) anticipated loss of tax revenues, housing and school impacts, and the loss of employment from base closure as if there were no positive benefits from reuse. These elements will then be compared to the gains expected as a result of the reuse options for the base. The impacts, both positive and negative, will be discussed in the second EIS to help the Air Force in its decision making with respect to disposal and reuse. Such analysis will be less speculative than it would be were it undertaken today, since an important component, developed reuse options including a community reuse plan, will then be available.

The OEA, located in the Office of the Assistant Secretary of Defense, provides the chief staff arm for the President's Economic Adjustment Committee (EAC). The EAC consists of federal department and agency heads and was established under Executive Order 12049 on March 27, 1978, to bring to bear the resources of various federal agencies in assisting communities impacted by base closures.

One of OEA's activities is to assist these communities to develop and implement a comprehensive economic recovery program. The EAC then affords priority assistance to community requests for federal technical assistance, financial resources, excess or surplus property, or other requirements that are part of this program.

Economic adjustment programs have been initiated in the communities affected by the Commission on Base Realignments and Closures. OEA is providing impact planning grants where required for community base reuse plans.

4.3.5.1 Employment and Economic Activity

The impacts on the social and economic systems resulting from the base closure -- e.g., employment losses, reduction in economic activity, secondary economic impacts, and impacts on the social structure -- are not addressed in this analysis. These topics will be discussed in the reuse EIS.

4.3.5.2 Public Utilities

Using 1987 and 1988 as test years for comparing utility output and service to Norton AFB, it appears unlikely that there will be any impact on the remaining ratepayers from the withdrawal of the base. The base consumed 74,129.4 MWh in 1987, and housing consumed 2,606.3 MWh. The combined total of 76,735.7 MWh accounts for only 0.1% of the total disposition for Southern California Edison (DOE 1987). Likewise, the natural gas use at the Norton facility (including housing) was about 453,382 million Btu, accounting for less than 0.05% of the output of Southern California Gas Company.

Of the current 0.85-1.0 million gal/day discharged from Norton AFB into the city of San Bernardino Water Reclamation Department sewer system, a significant portion will be eliminated due to the proposed withdrawal. The current estimated discharge into the system from all users is 25.5 million gal/day. The reduction in the Norton AFB discharge (less than 4% of the total discharge) will not affect the overall operation of the sewer collection and treatment system (Watson 1989).

4.3.5.3 Transportation

Impacts of Moving Vans. The estimated duration of the unit withdrawal from Norton AFB is six years (Fig. 2.1). The moving actions to different AFBs will be phased, with the relocation to March AFB estimated to continue for three years. The impact analysis in this section includes estimating the number of truck trips needed to move different facilities from Norton AFB to March AFB. The remaining planned relocation from Norton AFB to other bases is scheduled to be undertaken in various short-term phases over the six-year withdrawal. The expected impact from the moving action will be mainly due to the relocation to March AFB, which will be the destination for a majority of the moves. The impact of truck trips required for the withdrawal of units to other bases (i.e., McChord, Kirtland, Travis, Luke, and McClellan AFBs) was

approximated by assuming conservatively that materials for these bases will affect the same roads at the same time as the move to March AFB. This approach thus overestimates the impacts of the truck moves on the transportation patterns in San Bernardino and Riverside counties.

The estimation of the number of truck trips for relocation has been based on the square footage of buildings, from which an effective volume was calculated. Table 4.4 provides estimates of floor space, effective volume, and number of truck trips to move the effective volume; these estimates constitute a worst-case scenario. Based on the move duration and the assumption that the relocation will continue for 600 working days, the number of truck trips per day has been estimated to be 7.5.

In the study area, truck traffic averages about 10% of the total traffic volume on Interstate 10, 5% on Interstate 30, 11% on Route 60, and 10% on Interstate 215. The truck volumes are estimated from the data obtained from relevant highway interchanges in the region (Calif. Department of Transportation 1988). In comparison to the average daily truck traffic on the California State Highway System, the additional truck traffic associated with unit withdrawal is insignificant. It will contribute less than a 1% increment to the annual average traffic on the relevant highway segments between Norton and March AFBs.

Impacts of Commuters on Area Highways and Streets. For impacts of commuter traffic on the regional road system, the reassignment of personnel from Norton AFB to March AFB is the controlling factor. The analysis assumes that 3,497 employees will be transferred to March, with 2,947 employees (including major contractors) remaining at Norton AFB (see Table 2.3).

The analysis of impacts on roads included the following conservative assumptions (which overestimate the impact):

- The analysis was only for the increase in travel to March AFB and did not consider the effect of the decrease in travel to Norton AFB.

- The move of transferred personnel to housing nearer March AFB was not considered; that is, the locational distribution remains as illustrated in Fig. 3.16. This assumption is particularly conservative for military personnel that are typically rotated every 3-5 years; new personnel replacing existing personnel assigned to relocated units could be expected to find housing nearer March AFB. Nearly 75% of the personnel transferring to March AFB are military.

- The effect of deactivation of units at March AFB was not considered.

- Residents from a given general locality were assumed to all travel along the same route, which overestimates impacts for those routes.

Major highways and streets that would be used in the commute to March ARB are shown in Figs. 4.1-4.3.

Based on the above assumptions, impacts to interchanges along I-215, I-10, and Route 60 from the action are estimated as shown in Tables 4.5-4.7. The estimated traffic increase at any interchange is less than 2%. (Baseline data were obtained from a study by the Southern California Association of Governments [SCAG 1987].) Some interchanges, however, currently have volumes that exceed the design capacity (i.e., a V/C ratio > 1.0), and the increases from the action would contribute to the current congested conditions.

TABLE 4.4 Estimated Truck Trips to Relocate Norton AFB Facilities, by Primary Use of Facility Moved

Primary Use[a]	Floor Space (ft^2)[b]	Effective Volume (ft^3)	No. of Truck Trips[c]
Office	543,100	1,222,000	484
Warehouse or other storage	1,313,000	5,252,000	2,084
Shop, laboratory, medical office, or other area for use of equipment	1,278,600	2,109,700	837
Dormitory or other temporary housing	474,700	854,500	339
Recreation, dining, retail, or other common use	1,142,400	1,856,400	736
Total			4,480

[a]See Table A.1 in App. A for a summary of floor space occupied by each organization at Norton AFB.

[b]It is assumed that the floor space of materials to be moved is 75% of the office areas; 80% of the warehouse and storage areas; 55% of the shops, laboratories, and medical office areas; 60% of the dormitories and temporary housing areas; and 65% of the recreation and common use areas.

[c]Number of truck trips = (effective volume of each facility) ÷ (average volume of a standard truck, 2,500 ft^3).

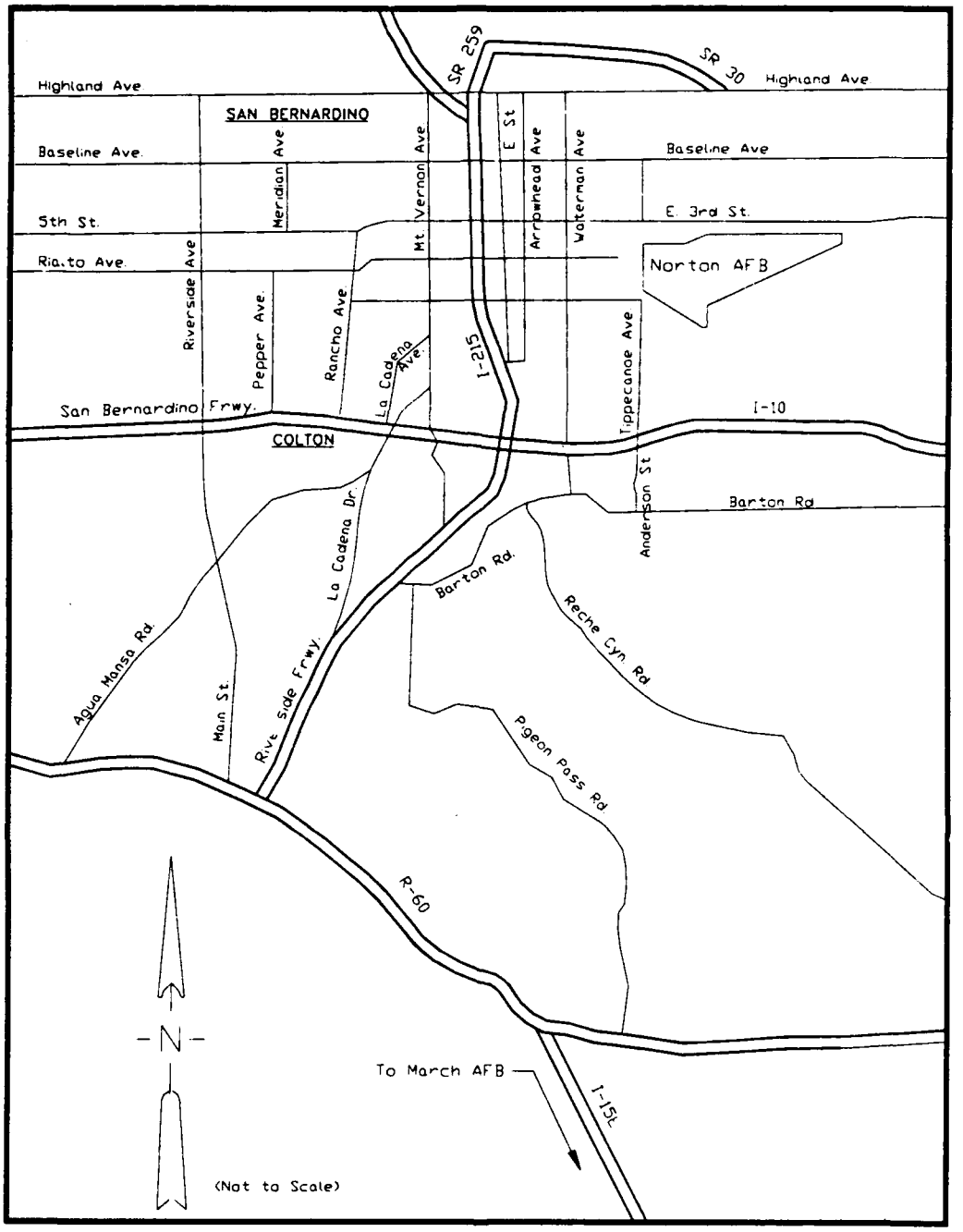


FIGURE 4.1 Alternate Roads to March AFB from San Bernardino and Colton

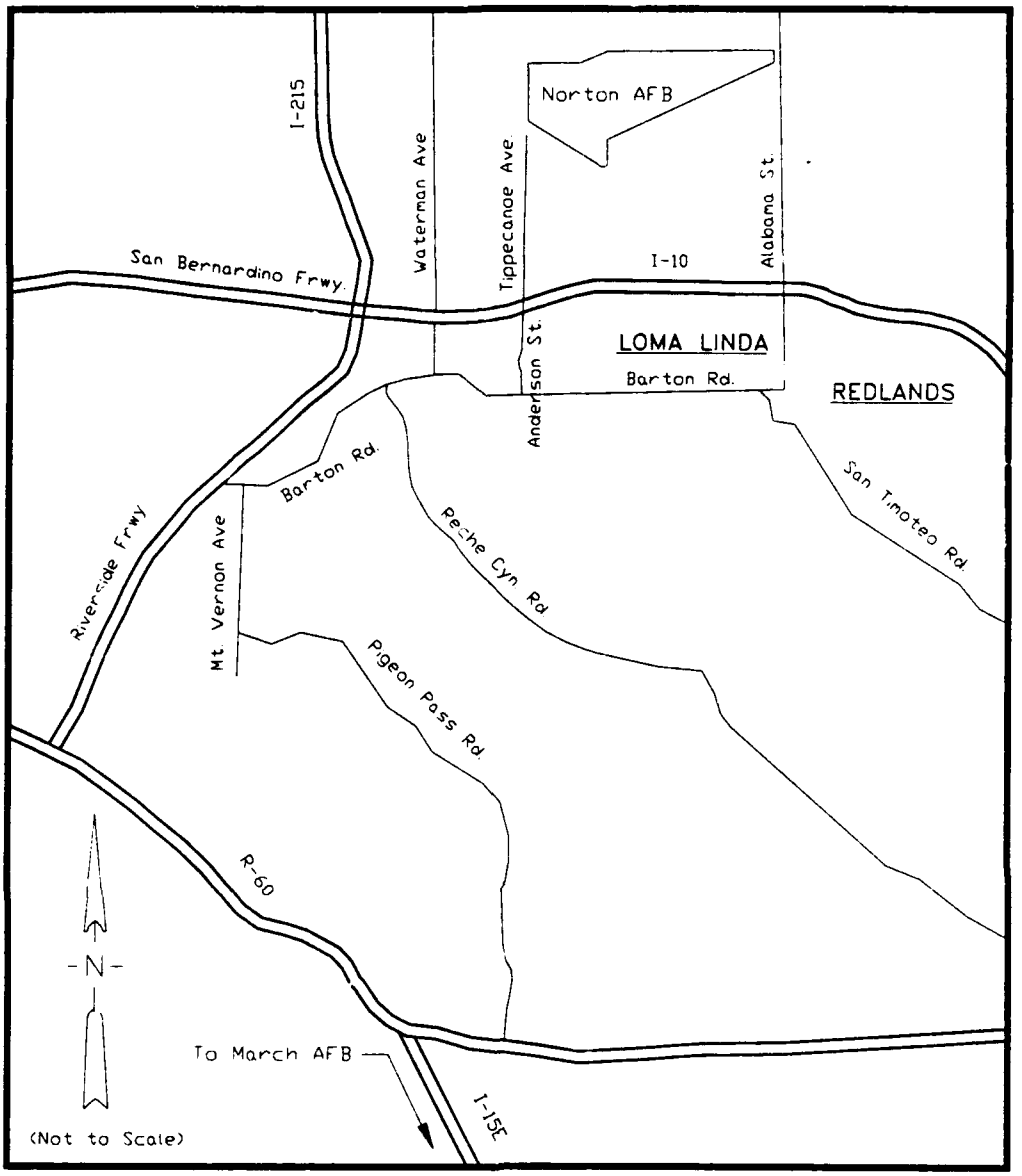


FIGURE 4.2 Alternate Roads to March AFB from Loma Linda and Redlands

The level of congestion on area roads is anticipated to increase independent of the action (Figs. 4.4 and 4.5), although the impact of the action on these roads can be expected to decline in the future as the off-site housing distribution for personnel formerly employed at Norton AFB shifts toward March AFB.

The military personnel occupying the 264 units of family housing to be retained at Norton AFB will continue to contribute to local road traffic loads because of their commute to March AFB.

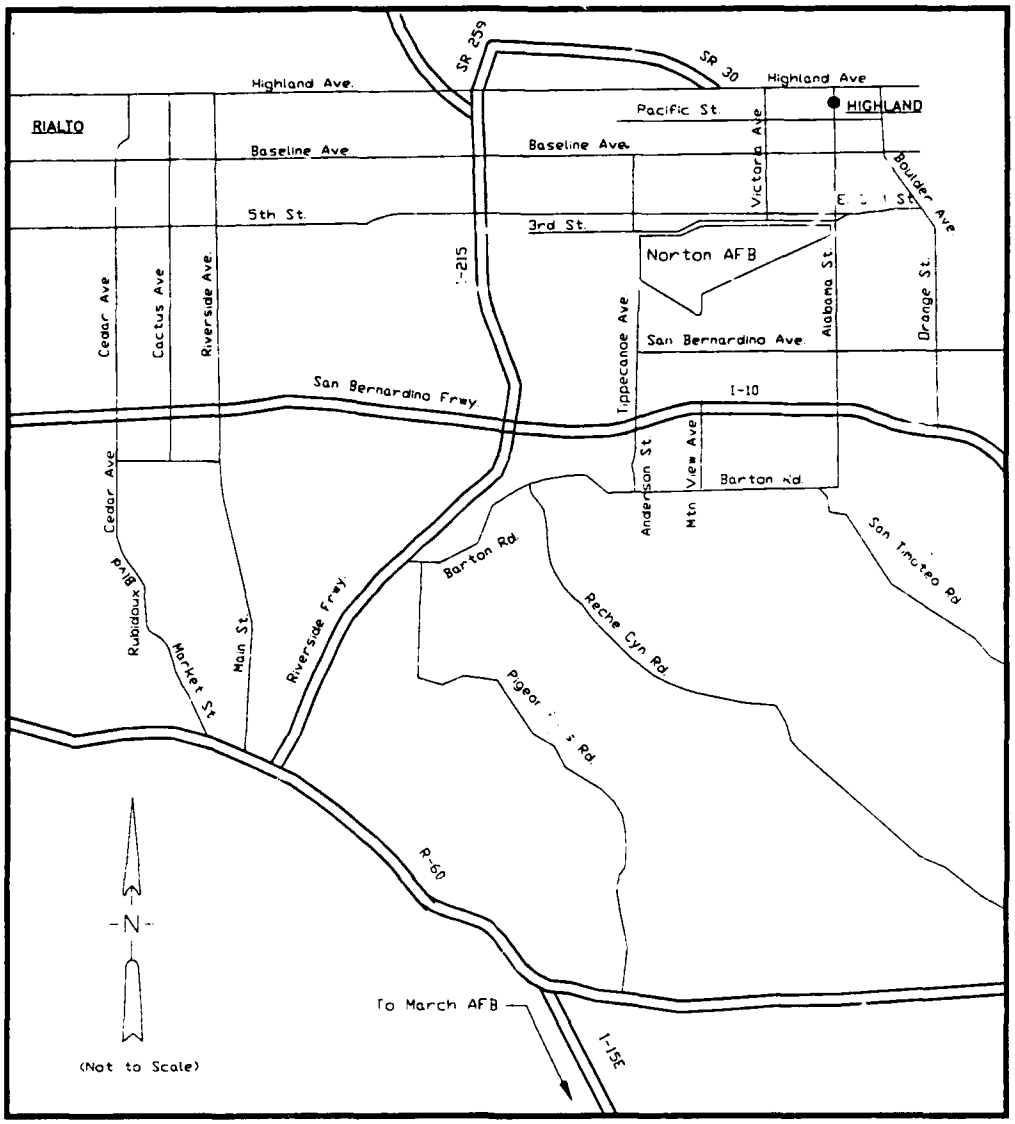


FIGURE 4.3 Alternate Roads to March AFB from Rialto and Highland

If commuters encounter delays on freeways, they may prefer to follow local streets and "short-cut" roads (Figs. 4.1-4.3). Specifically, Tippecanoe Avenue, Alabama Street, and Orange Street will carry the traffic flow from the San Bernardino (Norton) area, Redlands, and Highland during peak hours. If commuters exit from freeways (e.g., I-215 and I-10) to follow short cuts, the impacts will shift to Pigeon Pass, Riche Canyon, and San Timoteo Roads, which are connecting side routes to Route 60.

Reduced volume will be the impact to peak-hour traffic on local streets in the Norton AFB area. The average daily traffic immediately surrounding Norton AFB will fall by more than 60% of the current traffic. Transferred Norton AFB employees living in Redlands, Colton, Loma Linda, and other places west and south of the base need not approach Norton AFB to commute to March AFB. The commuters who avoid the delay

TABLE 4.5 Transportation Impacts on Interstate 215

I-215 Interchange[a]	Peak-Hour Volume	Average Daily Traffic	Traffic Increase (%)
Interchanges near March AFB			
Van Buren Boulevard	4,000	40,000	0.51
Cactus Avenue (exit to March AFB)	4,150	41,500	1.67
Allesandro Boulevard	4,000	40,000	1.21
Riverside			
Central Avenue	11,000	110,000	0.79
Jct. Rtes. 60 and 91 West (Riverside and Escondido Freeways)	12,500	125,000[b]	
Colton			
Center Street	11,200	112,000	0.16
Barton Road	11,200	112,000	1.22
Mount Vernon Avenue and Washington Street	11,100	111,000	0.99
Jct. I-10 (San Bernardino and Riverside Freeways)	14,000	140,000[b]	1.42
San Bernardino			
Orange Show Road	13,100	131,000[b]	0.84
Mill Street	12,700	127,000[b]	0.79
Jct. Rte. 66 West and Fifth Street	12,000	119,000[b]	1.00
Base Line Street	10,700	113,000	1.46
Jct. Rte. 30 and Highland Avenue	4,100	47,000	1.95

[a] Interchanges are listed in a south-to-north sequence.

[b] Congested: the V/C ratio is between 1 and 1.25.

Source: Baseline data from SCAG (1987).

TABLE 4.6 Transportation Impacts to Interstate 10

I-10 Interchange[a]	Peak-Hour Volume	Average Daily Traffic	Traffic Increase (%)
Fontana, Sierra Avenue	10,100	113,000	0.15
Bloomington, Cedar Avenue	10,300	114,000	0.15
Pepper Avenue	11,200	134,000[b]	0.94
Rialto, Riverside Avenue	10,800	130,000[b]	0.60
Colton			
Eighth Street	11,400	127,000[b]	0.17
Rancho Avenue	11,200	124,000[b]	0.51
Mount Vernon Avenue	11,200	124,000[b]	0.96
Jct. I-215 (Riverside and San Bernardino Freeways)	12,600 12,600	140,000 140,000	0.79 0.79
San Bernardino, Waterman Avenue	11,200	124,000	1.38
Loma Linda, Tippecanoe Avenue	10,300	114,000	0.98
Redlands			
Alabama Street	8,500	94,000	0.97
Jct. Rte. 38 North, Orange Street	7,200	80,000	1.16
University Street	6,600	73,000	0.63
San Timoteo Canyon Road	4,000	47,000	1.67

[a]Interchanges are listed in a west-to-east sequence.

[b]Congested: the V/C ratio is between 1 and 1.25.

Source: Baseline data from SCAG (1987).

TABLE 4.7 Transportation Impacts to State Route 60

Rte. 60 Interchange[a]	Peak-Hour Volume	Average Daily Traffic	Traffic Increase (%)
Mira Loma			
Van Buren Boulevard	6,100	61,000	0.08
Estiwanda Avenue	6,500	65,000	0.11
Sunnyslope, Valley Way Mission Boulevard	6,500	63,000	0.10
Riverside			
Main Street	7,100	71,000[b]	0.58
Orange Street Overcrossing	8,100	81,000[b]	0.58
Jct. I-215 North and Rte. 91 Freeways	7,500	75,000[b]	1.94
Sunnymead			
Pigeon Pass Road	6,100	61,000	1.21
Heacock Street	4,950	47,000	1.56
Moreno, Redlands Boulevard	2,700	25,500	1.75

[a]Interchanges are listed in a west-to-east sequence.

[b]Congested highway: the V/C ratio is between 1 and 1.25.

Source: Baseline data from SCAG (1987).

and congestion of highways might cause deterioration in the level of service on north-south local streets, such as Waterman Avenue, Tippecanoe Avenue, Alabama Street, Reche Canyon Road, Pigeon Pass Road, and San Timoteo Road.

With reference to the definition specified by the Transportation Research Board (1986) (see App. B), Table 4.8 presents the V/C ratios and levels of service of affected local streets. As indicated in the table, traffic volume on these area streets is well below capacity, with the exception of Waterman Avenue, which is near capacity. In addition to the higher traffic density on the north-south Highland Avenue, peak-hour traffic will increase on west-bound Baseline Avenue, 5th Street, 3rd Street, and Mill Street. However, the incremental increase in local-street traffic volume by former Norton AFB employees commuting to March AFB is less than 1%, and does not change the existing level of service indicated on Table 4.8.

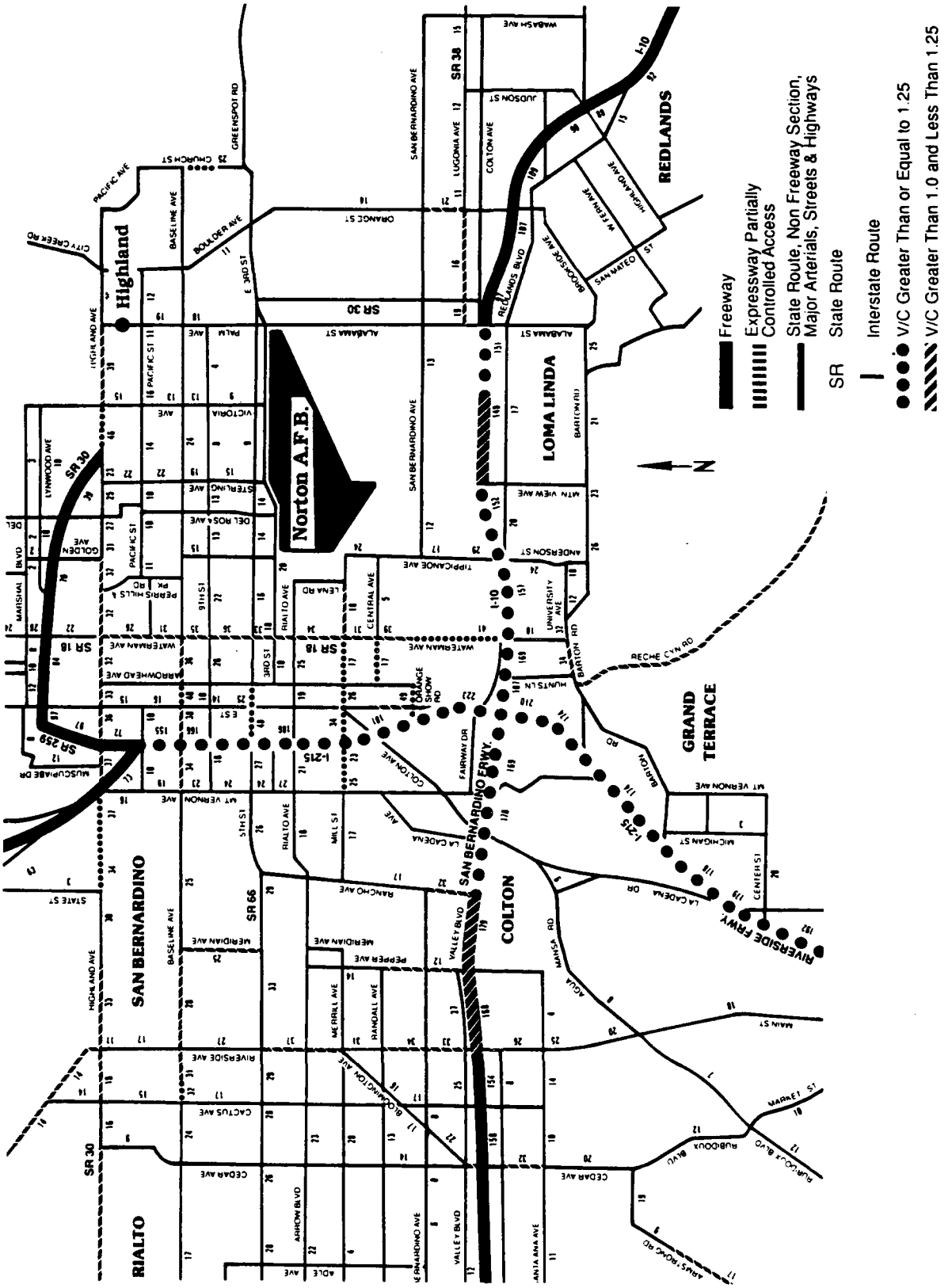


FIGURE 4.4 Average Daily Traffic (in 1,000s) and V/C Ratios on Study-Area Roads in 2010 if No Improvements Are Made to 1984 System (Source: SCAG 1987)

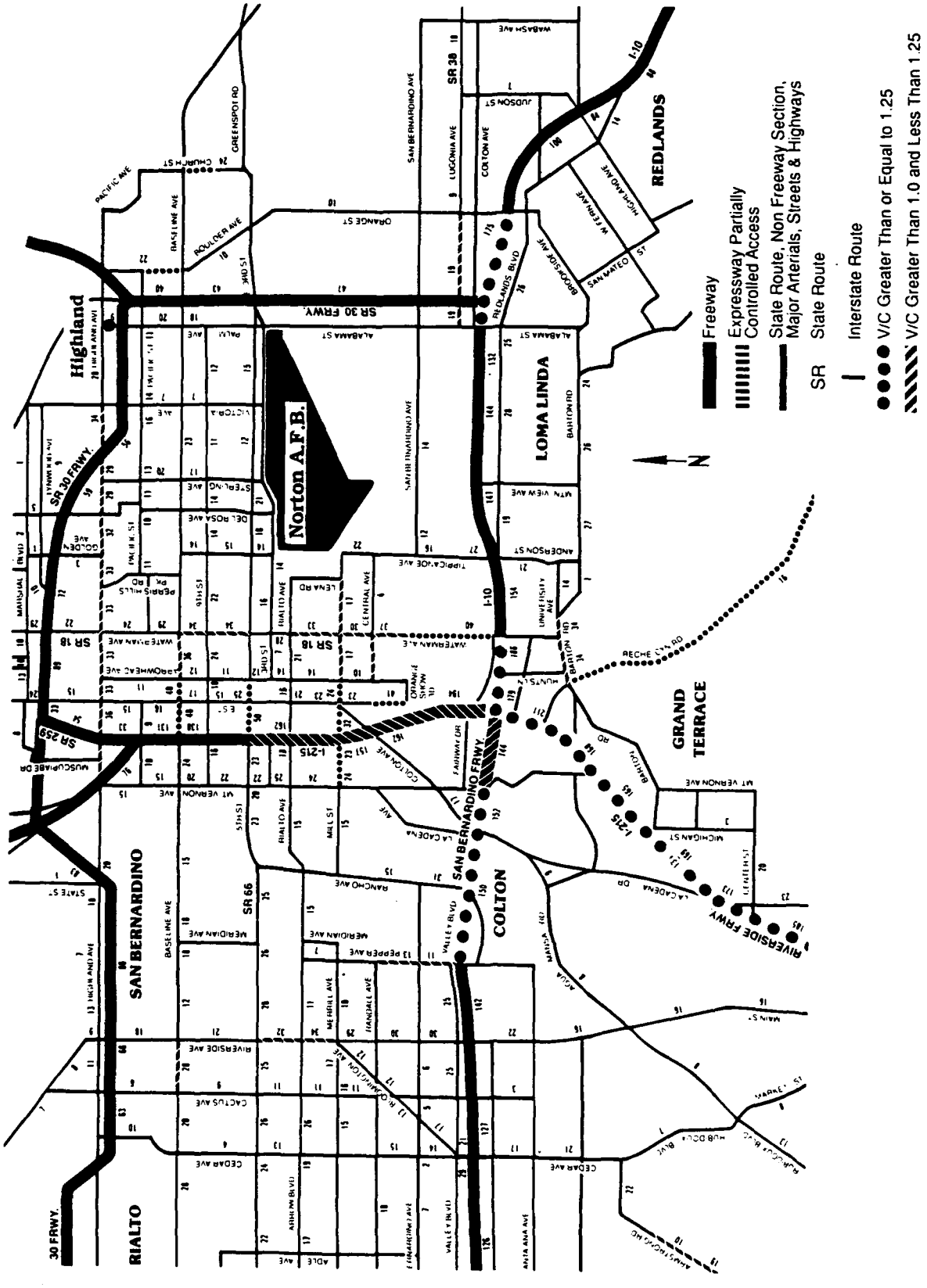


FIGURE 4.5 Average Daily Traffic (in 1,000s) and V/C Ratios on Study-Area Roads in 2010 if Proposed Improvements Are Made to 1984 System (Source: SCAG 1987)

TABLE 4.8 Transportation Impacts on Local Streets

Street	Direction	Change	Avg. 1988 Peak-Hour Volume	V/C Ratio	Arterial Level of Service[a]
Third Street	Westbound Eastbound	Increase	1,022 1,053	0.69	C
Tippecanoe Avenue	Northbound Southbound	Increase	830	0.56	A
Victoria Avenue	Northbound Southbound	Negligible	412	0.27	A
Waterman Avenue	Northbound Southbound	Negligible	1,372	0.92	E
Pacific Street	Both	Negligible	695	0.48	B
Palm Avenue	Northbound Southbound	Negligible	395	0.30	A
Fifth Street	Both	Increase	638	0.43	A
Alabama Street	Northbound Southbound	Increase	652 668	0.47	A
Barton Road	Eastbound Westbound	Increase	860 560	0.58	B

[a]Level-of-service definitions: A = primarily free flow, B = reasonably unimpeded flow, C = stable flow, D = congested flow, E = significantly delayed flow, and F = extremely slow flow. See App. B for further discussion.

Mitigative Measures. Over the short term, the Norton AFB unit withdrawal will contribute to a worsening traffic problem in the area. A number of regional road improvements that have been suggested at various times could help this situation, in particular the extension of Route 30 and the construction of the proposed Loma Linda - Moreno Valley Road with Mountain View and California Street alternates (Fig. 4.6).

In the absence of, or in addition to, improvements by state and local governments to regional roads and highways, the Air Force is considering several alternatives to mitigate withdrawal-related transportation impacts. These include encouraging employees to share rides by car/van pooling, staggering work hours of organizations, and allowing employees to work flexible hours. Implementation of some or all of these measures should reduce negative impacts from the unit withdrawal.

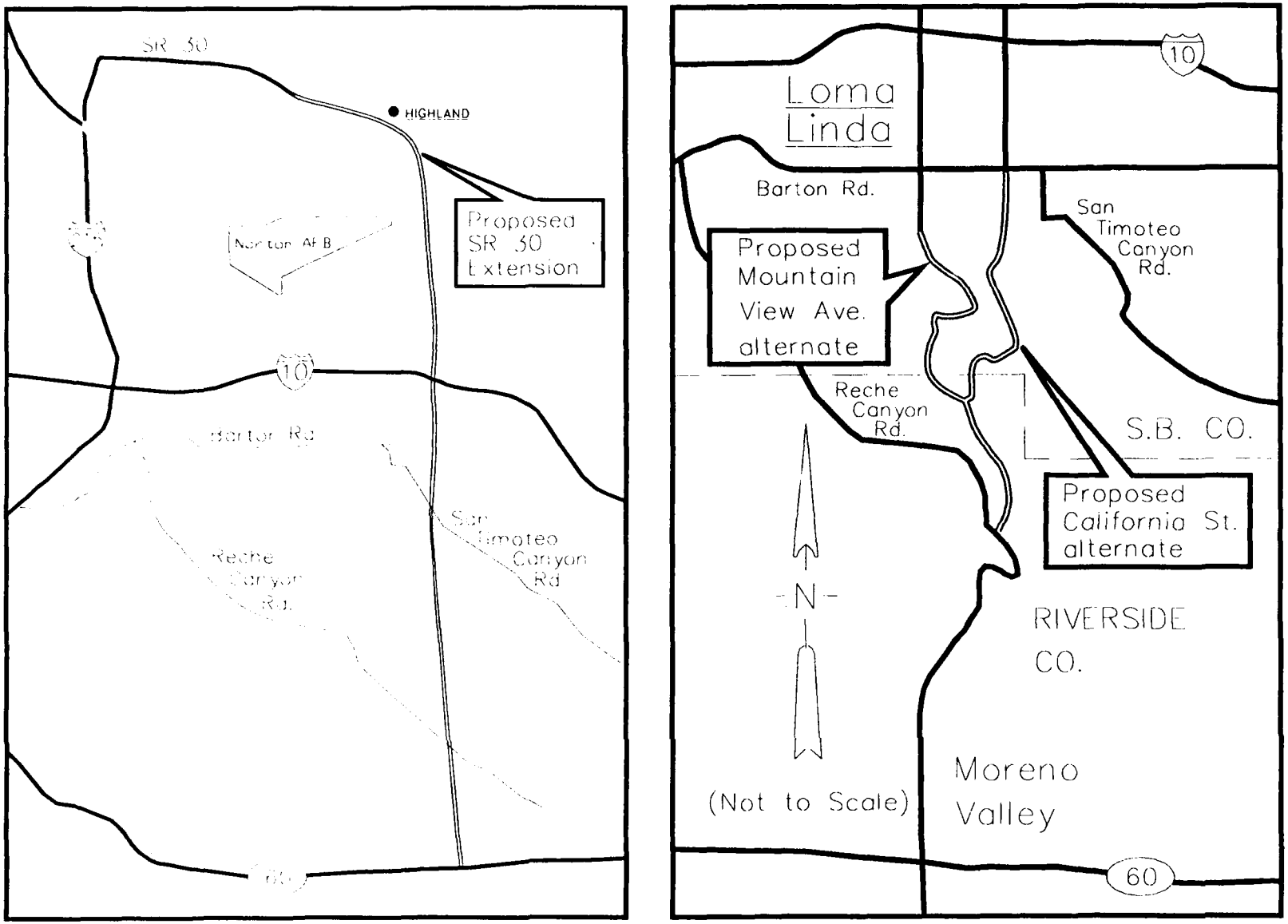


FIGURE 4.6 Proposed Road Construction near Norton AFB. *Left*: Route 30 Extension. *Right*: Mountain View Avenue and California Street Alternates

4.3.5.4 Recreational and Support Resources

The unit withdrawal would result in a loss of most, if not all, recreational facilities and support services at Norton AFB. This loss would affect the local community.

Troops and retired personnel that would not move from Norton AFB would seek recreational facilities and support services within the surrounding area or at March AFB about 20 mi away. Because of the large population in the Norton AFB area, there is a potential that some recreational facilities in the surrounding community would be adversely affected by increased use.

4.3.5.5 Military and Civilian Retirees

For base retirees, two types of impacts are identifiable. First, although several military bases are close to Norton AFB, it can be presumed that the proximity of Norton AFB made it the first choice of retirees needing medical or recreational services. Traveling to another site for such services will incur a certain amount of inconvenience for these retirees. If the other site is farther away from their homes, there will be costs associated with the additional travel required to reach comparable services. Second, there is the question of finding comparable services elsewhere (but relatively nearby).

4.3.5.6 Land Use

The action would not alter the current land use at Norton AFB.

4.4 CUMULATIVE IMPACTS

The action would result in no appreciable negative cumulative impacts.

4.5 COMMITMENTS OF IRREVERSIBLE AND IRRETRIEVABLE RESOURCES

Capital, energy, materials, and labor would be committed to the construction and rehabilitation of buildings for BSD and AAVS and for the transportation of equipment from Norton AFB to the other bases. Only lands previously committed to activities at Norton AFB would be affected by the activities that will remain at Norton AFB.

5 CONSULTATION AND COORDINATION

5.1 CONTACTS

The following agency representatives have been contacted, have participated in the scoping process, or have expressed interest in the action. Their input into this EIS has been requested.

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APPENDIX A:

SUPPLEMENTARY ORGANIZATIONAL AND OPERATIONAL INFORMATION FOR NORTON AIR FORCE BASE

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SUPPLEMENTARY ORGANIZATIONAL AND OPERATIONAL INFORMATION FOR NORTON AIR FORCE BASE

A.1 ORGANIZATIONS AND MISSIONS

Primary Organization and Mission

The 63rd Military Airlift Wing (MAW) is the host unit at Norton AFB; its mission is to maintain an immediate airlift capability to deliver and sustain air and ground combat forces anywhere in the world. The 63rd MAW also provides airlift augmentation as may be directed to Air Force components, exercises, and training programs to maintain a high state of readiness of all wing resources and assigned reserve forces. The wing also provides the support functions to maintain facilities at Norton AFB.

Tenant Organizations and Missions

Norton AFB is the host to several tenant organizations and provides services, facilities, and other support to these organizations. The following list identifies the missions of the major tenant organizations at Norton AFB.

Air Force Inspection and Safety Center Headquarters (AFISC)

The AFISC is responsible to the Inspector General for planning, directing, and evaluating the AFISC inspection system and safety programs and for evaluating the Air-Force-wide inspection system, to assist in ensuring that Air Force fighting capability is sustained and managed effectively.

Air Force Audit Agency Headquarters (AFAA)

The mission of the AFAA is to provide all levels of Air Force management with an independent, objective, and constructive evaluation of the effectiveness and efficiency with which managerial responsibilities (including financial, operational, and supporting activities) are carried out.

Military Airlift Command (MAC) NCO Academy-West

The mission of the MAC NCO Academy is to prepare selected noncommissioned officers (NCOs) for positions of greater responsibility by broadening their leadership and managerial capabilities and by expanding their perspective of the military profession. This is accomplished through a five-week in-resident course of instruction.

Headquarters, Ballistic Systems Division (BSD)

The mission of the BSD is to plan, implement, and manage programs to acquire ballistic missile systems and subsystems; support equipment and related hardware; provide for the alteration of missile sites and launch facilities; and discharge Air Force responsibilities as executive agent for designated Air Force, DOD, and international missile programs.

22nd Air Force NCO Leadership School

The mission of the 22nd Air Force NCO Leadership School is to prepare selected NCO's in grades E-4 and E-5 for positions of greater responsibility by creating an awareness of their full responsibilities and broadening their leadership and managerial capabilities so they may fulfill their proper role with the Air Force. The school's primary responsibility is to 22nd Air Force and associated units of MAC.

445th Military Airlift Wing (MAW) Reserve Associate Unit

The mission of the 445th MAW Reserve Associate Unit is to provide an additional source for both aircrew and maintenance personnel. The 445th MAW presently flies one third of the world-wide missions originating from Norton AFB. The 445th MAW is one of the largest Air Force Reserve units in the United States with over 3,000 assigned personnel.

Headquarters Aerospace Audiovisual Service (AAVS)

The headquarters for AAVS arrived at Norton AFB in 1968 and was established to provide audiovisual services and products to meet the requirements of the Secretary of the Air Force, HQ USAF, the major commands, and separate operating agencies.

1965th Communications Squadron (AFCS)

The 1965th Communications Squadron performs a three-fold mission at Norton AFB. It is responsible for meeting the communication needs of the 63rd MAW, operating the Defense Communications Agency's AUTODIN Switching Center, and providing all on-base communications and navigational aids facilities.

3562nd Recruiting Squadron

The 3562nd Recruiting Squadron headquartered at Norton AFB is one of 32 recruiting squadrons nationwide. The squadron headquarters directs recruiting activities; provides logistics, advertising, personnel, and administrative support; and monitors production for more than 80 field recruiters.

Detachment 505, 3754st Field Training Squadron

Field Training Detachment 505 was established to provide maintenance training for the 63rd MAW and organizations assigned to it. In addition to the 63rd MAW, Detachment 505 provides training to units of MAC, Air Training Command, detached units of MAC, transient students en route to MAC west coast assignment, Air Defense Command, Air Force Reserves, and Navy. Training is accomplished through classroom instruction and hands-on training. Hands-on training is attained through the use of mobile training sets or operational equipment located at the host organization work center.

Missile Storage and Maintenance Division

The Missile Storage and Maintenance Division is an element of the Directorate of Maintenance at McClellan AFB, California. Its primary mission is storage, maintenance, and shipment of Atlas and Thor missiles to the various sites and parent organizations. This support consists of maintenance, storage, corrosion prevention, inspection, receiving, and shipping of Atlas, Thor, and Titan II missiles; rocket engines; and related aerospace-ground equipment and airborne components.

Detachment 14, 17th Weather Squadron

Detachment 14, 17th Weather Squadron provides 24-hour observing and forecasting support to Norton AFB. Detachment 14 provides weather briefings to C-141, C-12, and C-21 aircrews; issues weather advisories and weather warnings for resource protection; and provides data for the Automated Weather Network.

Headquarters Air Force Office of Special Investigations (AFOSI), District 18

The mission of AFOSI is to provide criminal, counterintelligence, internal security, and special investigative services to all Air Force activities located in 12 counties in southern California and 9 in Nevada; to perform distinguished visitors protection services and operations; to collect, analyze, and disseminate information of investigative and counterintelligence significance; and to collect and report information that is pertinent to base activities.

Detachment 10, 1600th Management Engineering Squadron

This organization advises and assists HQ AAVS and the 63rd MAW commander and staff on all matters related to organization, manpower allocations and programs, manpower utilization practices, and management improvement. It is responsible for standards development activities directed by HQ MAC.

Detachment 42, Sacramento Air Logistics Center

Detachment 42 is a project support office (PSO) assigned to Headquarters, Sacramento Air Logistics Center, at McClellan AFB, California. The PSO is tasked with the responsibility of providing integrated logistical support to special Air Force programs and projects. As a logistics depot, the PSO performs logistics support functions common to support functions provided by the Air Force logistics centers. Support functions rendered include provisioning and procurement, inventory control, technical data and cataloging, financial management, transportation, and storage.

Defense Reutilization and Marketing Office (DRMO)

The mission of the DRMO is to provide for control, warehousing, and preparation of excess and surplus personal property for reuse, donation, sale, or other disposition. This includes the storage and disposal of hazardous waste.

Military Air Traffic Coordination Office

The Military Air Traffic Coordination Office serves as the principal element at the aerial port with liaison between the APOE and the shipper services and agencies in regard to operational matters. The office also ensures the orderly flow of military traffic (cargo and mail) into the airlift system.

A.2 FACILITY USE BY ORGANIZATIONS AT NORTON AFB

Table A.1 provides a listing of all major organizations at Norton AFB along with estimates of the floor space and facilities occupied by them.

A.3 AIRCRAFT CURRENTLY ASSIGNED TO NORTON AFB

C-141B Starlifter

The C-141 Starlifter is the "work horse" of the MAC. Along with the C-5 Galaxy, the C-141 forms MAC's existing intertheater airlift force. The Starlifter fulfills a vast spectrum of airlift requirements. MAC uses the C-141 to airlift combat forces over long distances; inject those forces, their equipment, and cargo either by airland or airdrop; resupply employed forces; and extract the sick and wounded from the hostile area to advanced medical facilities. The B model of the C-141 Starlifter is a C-141A model modified with a longer fuselage and an in-flight refueling capability.

TABLE A.1 Facility Use by Organizations at Norton AFB[a]

Organization	Floor Space (ft^2)	Facilities Assigned[b]
63rd Military Airlift Wing	2,121,300	
Command Office	30,600	2, 673
Public Affairs	NA	2
Safety	NA	538
Operations: 14th, 15th, 52nd, and 53rd Military Airlift Squad.	28,300	107, 537
Maintenance	103,500	795, 796
63rd Avionics Maint. Squad.	89,200	126, 701, 752, 757
63rd Field Maint. Squad.	831,800	108, 115, 769, 695, 726, 736, 76
63rd Organizational Maint. Squad.	24,700	12
Resource Management		
63rd Supply Squad.	359,000	422, 460, 514, 542, 545, 548, 637, 802, 803, 819, 854, 856, 858, 912
Base Contracting	39,900	538
Comptroller	20,500	505
Transportation	65,600	313, 330, 332, 333, 338, 339, 341, 342, 345, 820
63rd Aerial Port Squad.	528,200	118, 512, 558, 673, 719, 747, 749
63rd Air Base Group (Base Operating Support)	825,300	
Command Office	57,200	2, 109, 479, 534
Chaplain	15,600	104
Administration	27,700	455, 707
Personnel Office	87,300	502, 505, 537
Disaster Preparedness	3,600	537, 538
Staff Judge Advocate	7,400	538
Social Actions	4,900	538
63rd Civil Engineering Squad.	153,600	111, 112, 245, 299, 335, 401, 403, 404, 407, 409, 412, 414, 417, 418, 427, 428, 618, 657, 680, 705, 1264
Security Police	41,300	11, 44, 256, 423, 499, 608, 609, 655
Family Support Center	NA	609
Morale, Welfare, and Recreation	244,700	6, 7, 10, 23, 24, 48, 125, 142, 178, 181, 182, 190, 302, 475, 539, 615, 655, 707, 814, 818
Services	182,000	144, 145, 169, 425, 503, 512, 515, 517, 561
USAF Clinic Norton	100,900	100, 101, 103, 106, 421, 534, 912

TABLE A.1 (Cont'd)

Organization	Floor Space (ft^2)	Facilities Assigned[b]
445th Military Airlift Wing (AF Reserve Associate)	75,700	466, 518, 534, 536, 702, 742, 763, 795, 965
Other Tenant Organizations	1,628,500	
AF Audit Agency HQ	43,700	527, 528
AF Office of Special Investigations, District 18 and Det. 1840	18,700	534
AF Communications Squad., CA Region	237,100	56, 518, 538, 575
3562nd AF Recruiting Squad.	NA	518, 538
Defense Reutilization and Marketing Office	144,100	948, 961-964, 967, 968, 970, 976, 995
Det. 14, 17th Weather Squad.	2,400	795
1835th Electronics Installation Squad.[c]	9,200	122, 645, 658.
1965th Communications Squad.	108,700	168, 324, 424, 468, 477, 518, 520, 532, 533, 638, 795, 810, 831, 844, 864
Det. 505, 3754th Field Training Squad.	29,900	730
Defense Contract Admin. Service	1,500	210
22nd AF NCO Leadership School	24,700	128
U.S. Post Office Center	6,200	455
Army-Air Force Exchange Service		
South CA Area Exchange	164,200	58, 419, 512, 518, 533, 534, 620, 635, 673, 918
Norton Distribution Center	139,300	552, 555
Norton AFB Credit Union	4,900	21
Civil Air Patrol, Group 18	1,800	233
U.S. Army Medical Department Activity (Animal Clinic)	1,000	474
AF Inspection and Safety Center	94,100	83, 537, 538, 918, 984
1380th School Squad., MAC NCO Academy-W	43,100	491
Sacramento Air Logistics Center, Det. 42	249,000	915, 928, 938
2762nd AFLC Logistics Squad., Det. 6	304,900	535, 574, 924, 925, 932, 935, 966
Total for Above Organizations	5,047,700	
Organizations to Be Retained at Norton AFB		
Aerospace Audiovisual Service, HQ and 1352nd Squad.	296,000	126, 226-228, 248-251, 258
Ballistic Systems Division	523,300	520, 522-527, 950-953

[a]Abbreviations used: CA - California, Det. - Detachment, HQ - Headquarters, Maint. - Maintenance, NCO - Noncommissioned Officer, Squad. - Squadron(s).

[b]Some assignments are partial (i.e., more than one organization shares a facility).

[c]Deactivated.

Source: Wright (1989).

C-21A

The primary mission of the C-21A is operational support airlift. It provides rapid transportation of high-priority DOD personnel and cargo during peace and war. The C-21A can also be equipped for aeromedical evacuation. During contingencies and in wartime, the aircraft can deploy overseas in support of theater commanders. The C-21A is a twin turbofan engine aircraft used for cargo and passenger airlift. The safety and operational capability of the C-21A is increased by the autopilot, color weather radar, and tactical air navigation system (TACAN), as well as high-frequency (HF), very-high-frequency (VHF), and ultra-high-frequency (UHF) radios.

C-12F

The C-12F is a twin-turboprop operational support aircraft used for cargo and passenger airlift and as a trainer for newly rated pilots. The C-12F is equipped with weather radar; an autopilot; tactical air navigation system (TACAN); and HF, VHF, and UHF radios to provide for increased safety and operational capability.

A.4 PESTICIDE AND HERBICIDE USE AT NORTON AFB

Table A.2 identifies the pesticides and herbicides currently used at Norton AFB.

TABLE A.2 Pesticides Currently Listed in the Norton AFB Pest Management Plan

Trade or Common Name	Pest Controlled
Diazinon	Cockroaches, cutworms, spiders
Strychnine	Gophers, ground squirrels
Smoke bomb	Ground squirrels
Zinc phosphate	Ground squirrels
Diphacinone	Ground squirrels, pigeons
Bayon	Cockroaches
Phostoxin	Ground squirrels, gophers
Talon G	Rats, mice
ULD BP-100	Crawling and flying insects
Ficam W	Drywood termites, fleas, cockroaches, spiders
PT 270	Drywood termites
Glyphosate	Grasses
Amrol-90	Weeds, grasses
Diuron	Weeds, grasses
Wasp Freeze Pyrethrum	Wasps
Simazine 80	Weeds, grasses
Malathion	Mosquito larvae, aphids, fleas
Sevin 80W	Aphids
Sevin	Brown dog ticks
Diazinon 4E	Brown dog ticks, spiders
Diquat	Aquatic weeds
Balan	Crabgrass
Proturf System	Fungi
Chloronab	Fungi
Dursban M	Cockroaches
Chloroaniline	Brown patch
Daconil 2787	Dollar spot
Betasan	Crabgrass
Oust (sulfometuron)	Weeds, grasses
Dursban	Cockroaches
Combat	Cockroaches

Source: Maneri (1989).

APPENDIX B:

SUPPLEMENTARY INFORMATION FOR SAN BERNARDINO AND RIVERSIDE COUNTIES

APPENDIX B:

SUPPLEMENTARY INFORMATION FOR SAN BERNARDINO AND RIVERSIDE COUNTIES

B.1 AIR QUALITY

Tables B.1-B.3 provide summaries of the ambient air quality monitored at the San Bernardino, Redlands, and Riverside monitoring stations, respectively, for the period 1984-1988. The tables provide the data for each pollutant monitored, as well as the corresponding state and national standards (CAAQS and NAAQS, respectively) for comparison.

The California standards for 24-hour SO_2 concentrations, lead, and sulfate are values that are not to be equaled or exceeded. The other California standards -- those for ozone, CO, NO_2, 1-hour SO_2 concentrations, and PM_{10} -- are values that are not to be exceeded.

National standards -- except those for ozone and PM_{10} and those based on annual averages -- are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one. The 24-hour PM_{10} standard is attained when the expected number of days with a 24-hour average concentration above the standard is equal to or less than one. The annual arithmetic mean PM_{10} standards are attained when the annual arithmetic mean concentrations are equal to or less than the standard.

B.2 TRANSPORTATION

Table B.8 presents the level-of-service classification system used in the analysis of transportation impacts due to altered commuting patterns on local roads in the Norton AFB area (Sec. 4.3.5.3). The system is based on three classes of streets: Class I streets have a free-flow speed range of 35-45 mi/h and typical speeds of 40 mi/h, Class II streets have a free-flow speed range of 30-35 mi/h and typical speeds of 33 mi/h, and Class III streets have a free-flow speed range of 25-35 mi/h and typical speeds of 27 mi/h (National Transportation Research Board 1986).

TABLE B.1 Summary of Ambient Air Quality Data from the San Bernardino Monitoring Station, 1984-1988

Pollutant	Parameter Measured	Unit	Averaging Time	1988	1987	1986[a] 4th St.	1986[a] 3rd St.	1985	1984	Standard CAAQS	Standard NAAQS
Ozone	1st high	ppm	1 hour	0.28	0.25	0.30[b]	0.15	0.27	0.30	0.09	0.12
	2nd high	ppm	1 hour	0.26	0.25	0.19[b]	0.19	0.26	0.28		
	Days > CAAQS	No.	1 hour	173	166	116	33	155	173		
	Days > NAAQS	No.	1 hour	121	117	88	20	111	125		
CO	1st high	ppm	1 hour	9.0	11.0	9.0[b]	-	9.0[b]	9.0	20	35
	2nd high	ppm	1 hour	9.0	10.0	9.0	-	9.0[b]	9.0		
	1st high	ppm	8 hours	7.6	6.7	6.7[b]	-	5.3[b]	5.1	9.0	9.0
	2nd high	ppm	8 hours	7.0	6.4	6.3[b]	-	4.4[b]	5.0		
NO_2	1st high	ppm	1 hour	0.19	0.19	0.16[b]	-	0.15[b]	0.20	0.25	-
	2nd high	ppm	1 hour	0.17	0.17	16[b]	-	0.14[b]	0.16		
	Arithmetic mean	ppm	1 year	0.042	0.043	0.043[b]	-	0.038[b]	0.040	-	0.05
SO_2	1st high	ppm	1 hour	0.02	0.03	0.05[b]	-	0.02[b]	0.03	0.25	-
	2nd high	ppm	1 hour	0.02	0.03	0.04[b]	-	0.02[b]	0.02		
	1st high	ppm	24 hours	0.012	0.012	0.012[b]	-	0.010[b]	0.010	0.05	0.14
	2nd high	ppm	24 hours	0.009	0.011	0.010[b]	-	0.009[b]	0.010		
	Arithmetic mean	ppm	1 year	0.002	0.002	0.003[b]	-	0.002[b]	0.002	-	0.03

TABLE B.1 (Cont'd)

Pollutant	Parameter Measured	Unit	Averaging Time	1988	1987	1986[a] 4th St.	1986[a] 3rd St.	1985	1984	Standard CAAQS	Standard NAAQS
PM_{10}	1st high	$\mu g/m^3$	24 hours	289	211	285	136	-	-	50	150
	2nd high	$\mu g/m^3$	24 hours	171	160	157	129	-	-		
	Samples > CAAQS	No.	24 hours	40	36	20	6	-	-		
	Samples > NAAQS	No.	24 hours	3	2	2	0	-	-		
	Observations			56	61	29	6	-	-		
	Geometric mean	$\mu g/m^3$	1 year	66.8	55.2	66.4[b]	111.2	-	-	30[c]	-
	Arithmetic mean[d]	$\mu g/m^3$	1 year	80.2	70.0	78.7[b]	112.3	-	-	-	50
Pb	1st high	$\mu g/m^3$	30 days	0.12	0.15	0.20	0.23	0.31	0.47	1.5	-
	1st high	$\mu g/m^3$	cal. qtr.	0.08	0.13	0.19[b]	0.15	0.20	0.37	-	1.5
SO_4	1st high	$\mu g/m^3$	24 hours	15.8	17.6	17.8	14.6	19.4	23.4	25	-
	2nd high	$\mu g/m^3$	24 hours	15.0	13.7	14.6	12.9	18.9	17.5		

[a]The San Bernardino monitoring station was moved from East 3rd Street to 4th Street in 1986. The first column under 1986 shows the data collected at the new location, and the second column at the old location.

[b]Data presented are valid, but incomplete in that an insufficient number of valid data points were collected to meet EPA or CARB criteria for representativeness.

[c]Geometric mean of all reported values taken during the year.

[d]Arithmetic mean of the quarterly arithmetic means for the four calendar quarters of the year.

Source: CARB (1984-1988).

TABLE B.2 Summary of Ambient Air Quality Data from the Redlands Monitoring Station, 1984-1988

Pollutant	Parameter Measured	Unit	Averaging Time	1988	1987	1986[a] Grove	1986[a] D. St.	1985	1984	Standard CAAQS	Standard NAAQS
Ozone	1st high	ppm	1 hour	0.29	0.24	0.29[b]	0.22	0.33	0.29	0.09	0.12
	2nd high	ppm	1 hour	0.28	0.23	0.27[b]	0.16	0.30	0.29		
	Days ≥ CAAQS	No.	1 hour	176	161	133	11	158	160		
	Days > NAAQS	No.	1 hour	130	120	90	3	113	116		
CO	1st high	ppm	1 hour	-	-	-	-	-	2.0[b]	20	35
	2nd high	ppm	1 hour	-	-	-	-	-	2.0[b]		
	1st high	ppm	8 hours	-	-	-	-	-	0.9[b]	9.0	9.0
	2nd high	ppm	8 hours	-	-	-	-	-	0.3[b]		
Pb	1st high	$\mu g/m^3$	30 days	-	-	0.10	-	0.19	0.30	1.5	-
	1st high	$\mu g/m^3$	cal. qtr.	-	-	0.08[b]	-	0.15	0.23	-	1.5
SO_4	1st high	$\mu g/m^3$	24 hours	-	-	9.9	-	16.2	21.0	25	-
	2nd high	$\mu g/m^3$	24 hours	-	-	9.8	-	14.8	15.0		

[a]The Redlands monitoring station was moved from the University of Grove to Dearborn Street in 1986. The first column under 1986 shows the data collected at the new location, and the second column at the old location.

[b]Data presented are valid, but incomplete in that an insufficient number of valid data points were collected to meet EPA or CARB criteria for representativeness.

Source: CARB (1984-1988).

TABLE B.3 Summary of Ambient Air Quality Data from the Riverside (Rubidoux) Monitoring Station, 1984-1988

Pollutant	Parameter Measured	Unit	Averaging Time	1988	1987	1986	1985	1984	Standard CAAQS	Standard NAAQS
Ozone	1st high	ppm	1 hour	0.28	0.29	0.25	0.35	0.32	0.09	0.12
	2nd high	ppm	1 hour	0.25	0.27	0.25	0.34	0.32		
	Days ≥ CAAQS	No.	1 hour	178	168	161	173	176		
	Days > NAAQS	No.	1 hour	123	113	106	125	127		
CO	1st high	ppm	1 hour	9.0	9.0	9.0	8.0	8.0	20	35
	2nd high	ppm	1 hour	9.0	8.0	8.0	7.0	8.0		
	1st high	ppm	8 hours	6.8	6.1	6.0	5.7	6.3	9.0	9.0
	2nd high	ppm	8 hours	5.9	5.9	5.8	5.6	6.0		
NO_2	1st high	ppm	1 hour	0.19	0.21	0.16	0.16	0.17	0.25	-
	2nd high	ppm	1 hour	0.18	0.17	0.15	0.14	0.16		
	Arithmetic mean	ppm	1 year	0.037	0.027	0.032	0.035	0.035	-	0.05
SO_2	1st high	ppm	1 hour	0.02	0.02	0.02	0.02	0.02	0.25	-
	2nd high	ppm	1 hour	0.02	0.02	0.02	0.02	0.02		
	1st high	ppm	24 hours	0.012	0.009	0.008	0.010	0.011	0.05	0.14
	2nd high	ppm	24 hours	0.011	0.009	0.008	0.010	0.010		
	Arithmetic mean	ppm	1 year	0.001	0.001	0.001	0.001	0.002	-	0.03

TABLE B.3 (Cont'd)

Pollutant	Parameter Measured	Unit	Averaging Time	1988	1987	1986	1985	1984	Standard CAAQS	Standard NAAQS
PM_{10}	1st high	$\mu g/m^3$	24 hours	252	219	294	208	129	50	150
	2nd high	$\mu g/m^3$	24 hours	177	210	176	187	112		
	Samples > CAAQS	No.	24 hours	51	46	48	46	4		
	Samples > NAAQS	No.	24 hours	7	7	5	11	0		
	Observations	No.		61	60	61	61	10		
	Geometric mean	$\mu g/m^3$	1 year	81.8	73.5	74.1	80.9	41.2[a]	30	-
	Arithmetic mean	$\mu g/m^3$	1 year	94.9	89.6	86.0	96.1	53.4[a]	-	150
Pb	1st high	$\mu g/m^3$	30 days	0.10	0.14	0.17	0.27	0.54	1.5	-
	1st high	$\mu g/m^3$	cal. qtr.	0.07	0.12	0.16	0.22	0.40	-	1.5
SO_4	1st high	$\mu g/m^3$	24 hours	23.6	16.1	18.4	21.0	22.8	25	-
	2nd high	$\mu g/m^3$	24 hours	13.1	13.1	15.6	17.4	16.8		

[a]Data presented are valid, but incomplete in that an insufficient number of valid data points were collected to meet EPA or CARB criteria for representativeness.

Source: CARB (1984-1988).

TABLE B.4 Interpretation of Level of Service for Urban Streets

Level of Service[a]	Avg. Travel Speed by Class (mi/h) I	II	III	Interpretation
A	≥35	≥30	≥25	Primarily free flow at average travel speeds about 90% of the free-flow speed. Maneuverability within the traffic stream is completely unimpeded. Stopped delay at signaled intersections is minimal.
B	≥28	≥24	≥19	Reasonably unimpeded operations at average travel speeds about 70% of the free-flow speed. Maneuverability within the traffic stream is only slightly restricted and stopped delays are not bothersome. Drivers are not generally subjected to appreciable tension.
C	≥22	≥18	≥13	Represents stable operations. Maneuverability and lane changes in midblock locations maybe more restricted than in level B; longer queues or adverse signal coordination may contribute to lower average travel speeds, about 50% of the average free-flow speed. Drivers will experience appreciable tension.
D	≥17	≥14	≥9	Service at a level where small increases in flow may cause substantial increases in approach delay and, hence, decreases in arterial speed. Causes include adverse signal progression, inappropriate signal timing, high volumes, or some combination. Average travel speeds are about 40% of free-flow speeds.
E	≥13	≥10	≥7	Significant approach delays and average travel speeds 33% or less of the free-flow speed. Causes include some combination of adverse progression, high signal density, extensive queuing at critical intersections, and inappropriate signal timing.
F	≥13	≥10	≥7	Arterial flow at extremely low speeds, 25-30% of the free-flow speed. Intersection congestion and high approach density are likely at critical signaled locations. Adverse progression frequently contributes to this condition.

[a]As defined in Transportation Research Board (1986).

APPENDIX C:

FAUNA AND FLORA AT NORTON AFB

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C.1 BIRDS OBSERVED AT NORTON AFB

Order and Common Name	Zoological Name
Podicipediformes (grebes)	
Pied-billed Grebe	*Podilymbus podiceps*
Ciconiiformes (herons and egrets)	
Snowy Egret	*Egretta thula*
Great Blue Heron	*Ardea herodias*
Anseriformes (waterfowl)	
Mallard	*Anas platyrhynchos*
Gadwall	*Anas strepera*
Green-winged Teal	*Anas crecca*
American Wigeon	*Anas americana*
Northern Pintail	*Anas acuta*
Cinnamon Teal	*Anas cyanoptera*
Gruiformes (cranes and allies)	
American Coot	*Fulica americana*
Charadriiformes (shorebirds and gulls)	
Killdeer	*Charadrius vociferus*
Spotted Sandpiper	*Actitis macularia*
Ring-billed Gull	*Larus delawarensis*
Herring Gull	*Larus argentatus*
California Gull	*Larus californicus*
Falconiformes (birds of prey)	
Turkey Vulture	*Cathartes aura*
Black-shouldered Kite	*Elanus caeruleus*
Northern Harrier	*Circus cyaneus*
Cooper's Hawk	*Accipiter cooperii*
Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*

Order and Common Name	Zoological Name
Galliformes (domestic and game birds)	
California Quail	*Callipepla californicus*
Columbiformes (pigeons and doves)	
Band-tailed Pigeon	*Columba fasciata*
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Spotted Dove	*Streptopelia chinensis*
Cuculiformes (cuckoos and roadrunners)	
Greater Roadrunner	*Geococcyx californianus*
Stringiformes (owls)	
Burrowing Owl	*Athene cunicularia*
Caprimulgiformes (goatsuckers)	
Lesser Nighthawk	*Chordeiles acutipennis*
Apodiformes (swifts and hummingbirds)	
White-throated Swift	*Aeronautes saxatalis*
Anna's Hummingbird	*Calypte anna*
Piciformes (woodpeckers)	
Northern Flicker	*Colaptes auratus*
Passeriformes (perching birds)	
Black Phoebe	*Sayornis nigricans*
Horned Lark	*Eromophila alpestris*
Tree Swallow	*Tachycineta bicolor*
Scrub Jay	*Aphelocoma coerulescens*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Bushtit	*Psaltriparus minimus*
Brown Creeper	*Certhia americana*
House Wren	*Troglodytes aedon*
Cactus Wren	*Campylorhynchus brunneicapillus*
Ruby-crowned Kinglet	*Regulus calendula*
Western Bluebird	*Sialia mexicana*

Order and Common Name	Zoological Name
Passeriformes (cont'd)	
Mountain Bluebird	*Sialia currucoides*
American Robin	*Turdus migratorius*
Loggerhead Shrike	*Lanius ludovicianus*
Northern Mockingbird	*Mimus polyglottos*
European Starling	*Sturnus vulgaris*
Orange-crowned Warbler	*Vermivora celata*

B.2 PLANT SPECIES THAT CAN BE FOUND AT NORTON AFB

The following lists of plant species at Norton AFB were developed from the 1988 Norton Land Management Plan.

Ground Covers

Asparagus spengeri
Ice Plant (several species)
Gazania uniflora leycoleans (Trailing Gazania)
Potentilla verna
Osteospermum *fruiticosum* (African Trailing Daisy)
Pelargonium peltatum (Ivy Geranium)
Hedera helix (English Ivy)
Juniperus (Prostrate forms: Shore, Tams, Bar harbor, etc.)
Rosmarinus officinalis prostratus (Dwarf Rosemary)
Baccharis pilularis (Coyote Brush)

Shrubs

Dodonaea viscosa "Purpurea"(Hopseed Bush)
Ilex, several species (Holly)
Callistemon citrinus (Lemon Bottlebrush)
Callistemon viminalis (Weeping Bottlebrush)
Photonia fraseri (Red Lead Photinia)
Raphiolepis indica (Indian Hawthorne)
Verburnum tinus (Laurustinus)
Mahonia aquifolium (Oregon Grape)
Mahonia limariifolia
Nandina domestica (Heavenly Bamboo)
Xylosma congestum (Xylosma)
Heteromeles arbutifloria (California Holly)

Magnolia stellata (Star Magnolia)
Cortaderia selloana (Pampas Grass)

Trees

Acacia baileyana (Fern Lead Acacia)
Albizia julibrissin (Silk Tree)
Betula verrucosa (European White Birch)
Cedrus deodara (Deodar Cedar)
Ceratonia siliqua (Carob, St. Johns' Bread)
Chamaerops humilus (Mediteranean Fan Palm)
Cinnamomum camphora (Camphor Tree)
Erythea edulis (Guadalupe Palm)
Eucalyptus, over 50 species
Fraxinus, several species (Ash)
Jacaranda acutifolia (Jacaranda)
Lagerstromia indica (Crepe Myrtle)
Liquidambar syraciflua (Liquidambar)
Magnolia grundifolia (Southern Magnolia)
Olea europaea (Olive)
Phoenix reclinata (Clump Palm)
Pinus, several species
Prunus, several species
Platanus, several species
Schinus tereninthifolius (Brazilian Pepper Tree)
Trachycarpus fortunei (Windmill Palm)
Umbellularia californica (California Laurel)
Washington filifera (California Fan Palm)

Grasses, Legumes, and Weeds on Maintained Turf

Botanical Name	Common Name
Cynodon dactylon	Bermuda grass
Poa annua	Annual Bluegrass
Agrostis palustris	Creeping bentgrass
Lollum perenna	Perennial Ryegrass
Poa pratensis	Kentucky Bluegrass
Trifolium repens	White Clover
Festuca rubus	Creeping Red Fescue
Lollum multiflorum	Italian Ryegrass
Festuca elatier	Alta Fescue
Paspalum dilatatum	Dallisgrass
Festuca rubus commutata	Chewings Fescue
Medicago lupulina	Yellow Trefoil
Plantago lanceolata	Buckhorn

Botanical Name	Common Name
Stellaria media	Annual Chickweed
Cerastium vulgatum	Mouse Ear Chickweed
Digitaria sanguinalis	Crabgrass
Taraxacum officinale	Dandelion
Dichondra repens	Dichondra
Polygonum aviculare	Knottweed
Cyperus rotundus	Nutgrass
Plantago major	Plaintain
Portulaca oleracea	Purslane
Rumex acetosella	Sorrell
Amaranthus palmeri	Amaranth
Achilea milefollum	Yarrow
Holcus lanatus	Velvetgrass
Oxalis comiculata	Oxalis
Madicago hispida	Burr Clover

APPENDIX D:

Ldn METHODOLOGY

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Ldn METHODOLOGY

D.1 NOISE ENVIRONMENT DESCRIPTOR (Ldn)

The day-night average sound level (Ldn) metric for describing the noise environment was used to produce the noise contours presented in this assessment (Acoustical Society of America 1980). Efforts to provide a national uniform standard for noise assessment have resulted in adoption of Ldn by the U.S. Environmental Protection Agency (EPA) as the standard measure of noise for this procedure. It is used by numerous federal agencies, including the Department of Defense, Department of Housing and Urban Development, and the Federal Aviation Administration.

Use of the Ldn descriptor is a method of assessing the amount of exposure to aircraft noise and predicting the percentage of residents in a well-populated community that are *highly annoyed* (% HA) by the various levels of exposure (Committee on Hearing, Bioacoustics, and Mechanics 1977; Schultz 1978). The Ldn values used for planning purposes and for which contours are presented in this assessment are 65, 70, 75, 80, and 85 dB. Land use guidelines are based on the compatibility of various land uses with these exposure levels (U.S. Department of Defense 1964).

It is generally recognized that a noise environment descriptor should consider, in addition to the annoyance of a single event, the effect of repetition of such events and the time of day in which these events occur. Computation begins with a single-event energy descriptor and adds corrections for the number of events and the time of day. Since the primary noise impact relates to residential areas, nighttime events are considered more annoying than daytime events and are weighted 10 dB accordingly. The Ldn values are computed by first logarithmically summing the single-event energy values for all of the flight operations in a typical 24-hour day (after adding the 10-dB penalty to all nighttime-operation levels); then the average sound level is calculated for a 24-hour period.

As part of an extensive data-collection process, detailed information is gathered on the flight tracks flown by each type of aircraft assigned to the base and the number and time of day of flights on each of these tracks during a typical day. This information is used in conjunction with the single-event noise descriptor to produce Ldn values. These values are combined on an energy-summation basis to provide single Ldn values for the mix of aircraft operations at the base. Equal value points are connected to form the contour lines.

D.2 SINGLE-EVENT NOISE EVENT DESCRIPTOR (SEL)

The single-event noise energy descriptor used in the Ldn system is the sound exposure level (SEL). The SEL measure is an integration of the A-weighted sound pressure level over the time interval of a single event (such as an aircraft flyover), corrected to equivalent level for a reference period of 1 second. Frequency, magnitude,

and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft/engines at different power settings and phases of flight. SEL versus slant range values are derived from noise measurements made according to a source noise data acquisition plan developed by Bolt, Beranek and Newman, Inc., in conjunction with the Armstrong Aerospace Medical Research Laboratory (AAMRL) and carried out by AAMRL (Bishop and Galloway 1975). These standard-day, sea-level values form the basis for the individual-event noise descriptors at any location and are adjusted to the location by applying appropriate corrections for temperature, humidity, altitude, and variations from standard aircraft operating profiles and power settings.

Ground-to-ground sound propagation characteristics are used for ground run-up activities. Air-to-ground propagation characteristics are used whenever the aircraft is airborne and the line-of-sight from observer to aircraft is 7 degrees or greater above horizontal; if the line-of-sight is 4 degrees or less, ground-to-ground propagation characteristics are used. Between these angles, propagation characteristics are interpolated (Speakman et al. 1977).

In addition to use for assessing aircraft flight operations, the Ldn metric can also be used to assess aircraft and engine run-up noise emissions resulting from engine/aircraft maintenance checks on the ground. Sounds such as aircraft/engine ground run-up noise are essentially constant in level during each test run at a given power setting. Data on the orientation of the noise source, type of aircraft or engine, number of test runs on a typical day, the power settings used and their duration, and use of suppression devices are collected for each ground run-up test position. This information is processed along with *mean sound pressure level* (average-energy level) data to yield equivalent 1-second sound exposure levels, which are added (on an energy-summation basis) to the SEL levels generated by flight operations to produce Ldn contours reflecting the overall noise environment produced by both air and ground operations of aircraft.

D.3 NOISE CONTOUR PRODUCTION

Data describing flight tracks, flight profiles, power settings, flight paths and profile utilization, and ground run-up information by type of aircraft/engine are assembled and processed for input into a central computer. Ldn contours are generated by the computer using the airfield-supplied operational data and the standard source-noise data corrected to local conditions. The computer system plots these contours, which are provided in the text.

D.4 NOISEMAP COMPUTER PROGRAM

The Ldn methodology for military flight operations is implemented by use of the computer program NOISEMAP. NOISEMAP was initially developed in 1974 by the Air Force (Horonjeff et al. 1974) and utilizes a subsidiary code (*OMEGA*) to provide a file of military flight and ground maintenance operational data by aircraft type. The current versions of this code used for this study are OMEGA 10 and OMEGA 11.

D.5 REFERENCES

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